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Canadian Pulp & Paper Association Convenes

Biggest Attendance On Record Attracted to Annual Meeting—Many Papers Read and Discussed At Meetings of Woodlands and Technical Sections — Premier Proposes Round Table Conference to Settle Forestry Problems.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., January 29, 1937.—With one of the biggest attendances on record, and with enthusiasm and optimism more in evidence than at any time since the palmy pre-depression days, the annual meeting of the members of the Canadian Pulp and Paper Association, held here this week, was brought to a conclusion this evening. The meeting comprised three days of conferences, which included, besides the general meeting, the annual meetings of the Woodlands and Technical Sections and an exhibition of pulp and paper machinery and equipment. At the Woodlands and Technical meetings two full days were devoted to hearing papers on technical subjects and discussing them. Two important pronouncements at the general gatherings were the statements by Dr. H. T. Gusson, Dominion botanist, that unless radical action were taken, white pine blister rust would destroy Canada's valuable empire of soft wood in from thirty to fifty years; and the statement of Maurice Dulpessis, the Premier of Quebec, that his government would not allow any new pulp and paper mills to be built in the province until all those now constructed, including mills at present shut down, are fully occupied.

Another important development was the statement of Premier Dulpessis that he proposed to call a round table conference "to settle once for all" the problems of the forestry industry. At a later meeting this conference was fixed for February 11, 12 and 13, in Quebec City. The laws, which have not been revised since 1910, will be gone over; efforts will be made to bring about uniformity with the laws of Ontario and the Maritime Provinces; measures for forest protection will be gone into; it will be the endeavor to apply the same editions to operators on private lands as to those on Crown lands; and a collective labor agreement will be discussed—all with a view to the greatest possible co-operation between all parties for the good of the industry and those engaged in it.

Altogether the annual convention, which was more comprehensive and covered more ground than that in any previous year, was a great success, all the arrangements working smoothly under the general direction of the Secretary-Manager, A. E. Cadman.

The President's Address

The president, R. A. McInnis, who, by the way, was re-elected president for the ensuing year, opened the general meeting with an interesting review. He said:

"The year 1936 was the record productive year in the history of this industry.

"The increased demand for newsprint placed a strain on the available productive capacity of the industry, especially so as 1935 had shown a very considerable increase over 1934.

"The increased demand for mechanical, sulphite and kraft pulps and for book, writing, tissues, board, wrapping and other grades of paper enabled the mills to operate on more satisfactory schedules than for some time past. This situation reflects the greatly improved business conditions in Canada as well as in the United States and present indications are that we can look forward to a continuation of this demand—in fact, we are confidently looking forward to an increased demand.

"While the industry is in substantially better shape as a result of increased demand, it is still receiving an entirely inadequate return for its products. The industry has already had to face rising costs for its wood, materials and labor, and is at the present time facing the possibility of still further advances although the industry as a whole has not been able to resume payment of interest on invested capital.

"As a result of the reduced consumption during the depression and the consequent woefully low prices received, many companies in the industry found themselves in financial difficulties of various kinds, but during the year 1936, due to general improved business conditions and to improved demand for their products, a number of companies completed their financial reorganizations, with the result that today there are very few companies which are still in receivership and it is expected that by the end of 1937 those companies will have completed their reorganizations.

The Newsprint Situation

"We are particularly gratified with the improved position of newsprint, which represents the major portion of our products. In 1935 the Canadian mills produced 2,753,289 tons which was a substantial increase over 1934, but in 1936 they produced 3,190,599 tons—a gain of 15.9 per cent over 1935 and a gain of 16.9 per cent over 1929.

(Continued on page 19)

Paper Business Continues Active In Chicago

Demand for All Standard Grades of Paper Continues to Expand—Book, Sulphite and Groundwood Papers Display Strength—Greater Tonnage of Kraft Paper Moving Into Consumption—Higher Paper Board Prices Indicated.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., February 1, 1937.—The Chicago paper market continues strong and gives ample evidence of growing stronger. Material boosts in the price structure of certain lines have caused no slackening of demand and reports from various centers indicate that there may even be further strengthening in the future. The kraft market, locally, has reported no further actual price increase although even more tonnage is being booked than last week. Local representatives of kraft mills expect that the shortage of pulp and heavy demand might even result in mills being from four to five months behind in orders if the present situation remains unchanged.

The market also looks much stronger in virtually all other grades with groundwoods, sulphites, books and other lines showing almost identical statements of raw material shortages and heavy tonnage requirements. The paperboard market is expected to forge ahead rapidly as raw materials bought at lower prices reach the point of absolute disappearance.

Most Chicago sales offices interviewed gave out statements indicating that tonnage was improved over the past week and that the future looked even more promising, the only pessimistic notes being the rising costs of doing business and the disconcerting labor picture with the floods likely to cause some trouble. Waste paper markets were steady last week with no outstanding strength in any specific grades reported.

Distribution of Odd Lots

The recent local movement which has resulted in the incorporation of the Gibralter Paper Company is certain to cause much food for comment at the coming annual sessions of the National Paper Trade Association. The full plan of the new Company, which is made up of around a dozen local paper merchants, has not been revealed, although it seems definite that the main job of the organization will be to protect the interests of standard papers from abuses allegedly arising from the operations in the sale of "odd lots" or "seconds".

Certain mill representatives in Chicago who feel the program to be a good thing are expecting that the mills will be aided materially in the stabilization of the distribution of "odd lots" so that when certain papers are given an agreed designation the merchandise will actually be sold as such without any misrepresentation. It would thus seem that the local paper merchants who have taken out the charter are definitely after a program to standardize operations in the sale, distribution and actual classification of "seconds".

It seems almost certain that these paper merchants, whose experiences with the sale of these products have been reputedly none too happy, will make every effort to secure the cooperation of their mill connections to stop costly methods of handling merchandise not standardized as to quality and quantity.

Included among those merchants who are reported to be interested in the Gibralter organization are the James White Paper Company; Empire Paper Company; Moser Paper Company; Swigart Paper Company; Chicago Paper Company; Parker, Thomas & Tucker; J. W. Butler Paper Company; Messinger Paper Company, Marquette Paper Company and Bradner Smith & Co.—all well and favorably known fine paper houses of Chicago. If interest in Chicago is any criterion, the local merchants have taken a step which seems certain to invite unusual consideration when all branches of the industry get together in New York next month.

News of the Industry

The Mid West Division of the Salesmen's Association of the Paper Industry spent the greater part of its time on Monday, January 25, discussing general market conditions and in completing plans for the annual trek to New York and the annual meetings of the industry. Chairman of Transportation I. H. Coy reports that the regular service of the Commodore Vanderbilt of the New York Central Lines is to be utilized to carry what is expected to be a record breaking crowd of salesmen and paper executives. The party will leave on Sunday, February 21.

Ben Babbitt, Brown Company sales executive and active in Salesmen's association affairs, is sojourning in Florida at the present time recuperating from his recent serious illness. Friends of Mr. Babbitt report that he intends to stay there until he is fully recovered. Meanwhile, George K. Gibson, of Mosinee, has been to Florida, returned to Chicago and departed again for sunnier climes, expecting to leave the South direct for the New York meetings.

Because of an announced desire to be relieved of the many duties demanded of the secretary-treasurer of the Chicago Paper Association, James Danehy, of the Schwarz Paper Company, is to retire in favor of John L. Richey, who has recently been appointed counsel, secretary and treasurer of the local wrapping paper association. Mr. Richey's widespread interests are expected to be of assistance in coordinating the work of the Middle States Wrapping Paper Association; Central States Paper Trade Association and Tri-States Wrapping Paper Association with that of the local group with respect to coarse paper markets in this territory. The new secretary-treasurer expects to meet with the Chicago group at regular meeting dates. Henry G. Thoms, Peerless Paper Company, is president of the Chicago Paper Association.

Paterson Parchment Plans Expansion

At the annual meeting of the stockholders of the Paterson Parchment Paper Company, held at Bristol, Pa., January 27, the following officers were elected.

President and treasurer, C. H. Cashmore; 1st vice-president, W. C. Leonhard; 2nd vice-president, G. C. Mayer; General manager, R. T. Anderson; Assistant general manager, E. D. Leonhard; Assistant Treasurer, J. T. Leonhard and Secretary, G. Mergargee.

Announcement was made that construction of another paper making machine has been started. The steady demand for the company's products has exceeded the present capacity of the Bristol plant for some time past. With the additional paper making equipment it is hoped to speed up all customer service.

Amer. Writing Reorganization Plan Approved

Federal Judge McLellan States Plan May be Confirmed In Usual Form, Following Hearing At Which No Opposition Was Forthcoming — Comptroller Reynolds Testifies to Its Feasibility—Operations Cover Fixed Charges.

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 1, 1937—Following a hearing January 28 at which no direct opposition to the proposed plan of reorganization of the American Writing Paper Company was forthcoming, Federal Judge McLellan said the plan may be confirmed in the usual form.

Counsel Chapin for the company said the proposed plan was accepted last week by over two-thirds of each class of debt and a majority of each class of stock was filed with the court. Up to 5 p. m. yesterday no notices of revocation of acceptances had been received.

Comptroller Reynolds testified to the feasibility of the plan and to the fact that the company's operations now are such as to adequately cover fixed charges. He said the reorganized company can make money in the field of paper manufacture and meet competition of cheap papers made from sulphite and rags.

Mr. Reynolds said gross income in 1934 was $4,925,388, in 1935 was $5,713,604 and in 1936 was $6,602,057. Under the proposed plan net income for 1936, subject to final audit, was $83,437.

Counsel for a New York group holding $100,000 of bonds, while stating that those for whom he spoke had filed acceptances to the plan, thought the company should not go to the R. F. C. for a loan, but should raise the entire amount from bond and stockholders.

Mills Booked Well Ahead

Paper jobbers here found the last week fully as favorable as the previous one. It is estimated that the volume of business during January was about the same as that of December. Booked up with orders, mills are necessarily slow in deliveries in some cases.

In fine papers, publishers have been buying ahead in anticipation of further advances. Wrapping paper orders came in in substantial volume, with delivery from manufacturers becoming more and more difficult. At least one dealer in kraft papers looks for a very good year and undoubtedly this is the feeling of many others. Tissues moved well, with prices up. Orders for boxboard were fairly substantial, with box manufacturers still operating freely.

Paper stock continued fully as firm, with no weakness expected in the near future. In old papers, old newspapers advanced to .52½ @ .57½ from .50 @ .55, No. 1 kraft to 1.40 @ 1.45 from 1.35 @ 1.40, and transmission rope to 1.90 @ 2.00 from 1.70 @ 1.80, all f. o. b. Boston. In bagging, foreign manila rope rose to 3.50 @ 3.60 from 3.10 @ 3.30, jute rope to 2.25 @ 2.50 from 2.12½ @ 2.25, and Australian wool pouches to 2.90 @ 3.00 from 2.75 @ 3.00, f.o.b. Boston. New and old domestic rags and foreign rags continued steady.

News of the Industry

At the annual meeting of the New England Paper Merchants Association, to be held at the Hotel Touraine Feb. 3, the following slate will be voted on: President, Frank H. Winter, Carter, Rice & Co., Corp.; First Vice-president, John R. Halkyard, Providence Paper Company, Providence, R. I.; Second Vice-president, J. Frank Halloran, Century Paper Company; Secretary and Assistan Treasurer, John C. Hurd; Treasurer, Frank B. Cummings, and Auditor, Raymond B. Nicols, Storrs & Bement Company. Board of Directors or Executive Committee members, W. E. Porter, Jr., Cook, Vivian Company; Arthur C. Biza, Henry Lindenmeyr & Sons, Hartford, Conn.; Harry J. Dowd, H. J. Dowd Paper Company, and John E. Roach, Fort Hill Paper Company. Representatives to the National Paper Trade Association, John H. Brewer, Storrs & Bement Company, and Floyd H. Blackman, D. F. Munroe Company.

Besides Chester A. Spaulding, assistant secretary of the National Paper Trade Association of the United States, previously announced as a speaker, John R. Shultz, secretary of the Boston Typothetae, Inc., and president of the Boston Trade Association Executives, will talk on matters of particular interest to the fine paper merchants. The Community Fund Film, "Twenty-four Hours," will be shown.

Donations for the Community Fund are coming in fast, with almost every paper house and mill sales representative contributing.

Watson M. Gordon, for many years advertising manager of the S. D. Warren Company and recognized as a national figure in advertising circles, has been added to the commercial division of Doremus & Co., Inc., Boston. Mr. Gordon, who organized the sales force of S. D. Warren Company and supervised its merchandising activities for many years, is also the author of many books on the relationship between advertising and selling. He was also a contributor of the book, "Careers in Advertising." He is a member of the board of directors of the S. D. Warren Company and the Association of National Advertisers and Advertising Club of Boston. He will be in charge of the merchandising and sales promotion plans and a member of the newly organized creative policy committee of Doremus & Co., Inc.

The J. J. Murphy Paper Company, New York, has opened an office at 89 Broad street, Boston, under charge of Albert E. Hahn.

Henry L. Goodman, mill representative, handling fancy papers, including box coverings, leaves Saturday, Feb. 6, for Chicago, where, accompanied by Mrs. Goodman, he will join the American Express Land Cruise to Mexico. Mr. and Mrs. Goodman expect to be away about three weeks.

Charles H. Wilkinson, president of the Kent Paper Company, Inc.; James Reid, popularly known as "Jim," formerly in charge of the box and printing department of the H. D. Foss Company at Cambridge, now general manager of the Bangor Paper Box Company, Bangor, Me.; and J. S. Miller, secretary of the New Haven Pulp and Board Company, New Haven, Conn., called on the trade last week.

Albert French, of A. F. French & Co., paper box manufacturers, Lowell, Mass., has gone on a trip to Bermuda, accompanied by Mrs. French.

The Hub Folding Box Company, 14 Binford street, has added another floor to the plant, affording considerable more space.

Rhinelander Paper Reports $237,120 Net Profit

President Folke Becker States Earnings for 1936 Were Far in Excess of 1935, When Net Was $145,255 — Company Started January With Largest Volume of Orders Booked in This Month — Will Add New Paper Machine.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 1, 1937—Rhinelander Paper Company, Rhinelander, Wis., closed the year 1936 with a net profit of $237,120, according to the report submitted at the annual meeting of stockholders January 29 by Folke Becker, president. Earnings were far in excess of the year 1935, when the net was $145,255, which was before $25,000 for addition to reserve in timber holdings. Earnings were equal to $7.99 a share on the capital stock, as compared to $4.84 for the previous year.

Mr. Becker pointed out that charges against earnings in 1936 for income, property and other taxes were approximately $172,000, equal to $5.73 per share, an increase of $70,000 over the preceding year.

Dollar sales showed an increase of 16 per cent over 1935. The cash position is excellent, with cash in banks exceeding the entire amount of current liabilities. Current assets aggregated $1,279,350.29, and current liabilities, $316,484.50, a ratio in excess of four to one. Working capital increased approximately $210,000 during the year.

The company started January with the largest volume of orders it has ever had on hand at this time of the year, President Becker further stated. New specialties in the embryo stage a year ago have shown a satisfactory volume of profit. These items played an important part in the decision of the board of directors to add another paper machine, the building addition for which is now under construction.

Paper Chemistry Institute Changes

Thomas N. Barrows, who this week assumed the presidency of Lawrence College, Appleton, Wis., also took over his duties as director of the Institute of Paper Chemistry, affiliated with the college. The president automatically becomes the director. He succeeds Dr. Henry Merritt Wriston, who became president February 1 of Brown University, Providence, R. I.

Dr. Wriston was honored at a civic banquet January 27 at Alexander Gymnasium, attended by 400 persons, including business and professional men of Appleton, Neenah and Menasha, and the college faculty and students. During his presidency of eleven and a half years, he founded the Institute of Paper Chemistry. The story of its modest beginnings thirty days before the depression of 1929 broke were described in an address by Ernst Mahler, vice-president of the Kimberly-Clark Corporation, Neenah, Wis., who assisted in the establishment of the Institute, and has since served as president of its board of trustees. Attorney E. J. Dempsey of Oshkosh, Wis., vice-president of the Riverside Paper Corporation, Appleton, Wis., addressed the audience on behalf of the board of trustees of the college, of which he is a member, praising the administrative ability and outstanding accomplishments of Dr. Wriston, and voicing the regret expressed by each speaker at the loss to the college because of his resignation. Dr. Wriston was presented with a tooled leather book containing autographs of all present at the banquet, a set of silverware, and a gold-framed sea scape painted by Johnson Benson. Westbrook Steele, executive secretary of the Institute, was a member of the committee arranging the banquet.

News of the Industry

Nicolet Paper Company, De Pere, Wis., has been denied an injunction by Federal Judge F. A. Geiger at Milwaukee, Wis., restraining the National Labor Relations Board from holding a hearing on charges brought by two labor unions. The dismissal of the petition followed a recent ruling of the United States Circuit Court of Appeals which quashed injunctions Judge Geiger had granted in similar cases. Counsel for the company asked Judge Geiger to delay dismissal until the supreme court ruled on the Wagner Labor Relations Act's constitutionality, but the judge replied he felt bound by the appellate court's ruling. The unions contended the company was interfering with collective bargaining negotiations.

Pulpwood movement by raft and steamer across Lake Superior from Canada will be more extensive than ever during the coming season. The Marathon Paper Mills Company, Rothschild, Wis., is planning to move 35,000 cords from Canada to Ashland, Wis., by towing it in rafts across the lake, and loading it by rail to Rothschild. This is the first time the company has attempted this plan. The Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., has followed this system for a number of years. Marathon's normal consumption is 80,000 cords, and the remainder will be obtained through customary channels.

Commercial pulp shipments direct from Europe will be made by the Marathon company to its tissue mill at Ashland. The Oscar Styffe Company, Ltd., of Canada, expects to ship at least twenty cargoes of pulpwood through the Ashland port to its mill customers. Another pulpwood loading hoist is being erected at Ashland by Charles Bidgood-Martin C. Kausrud, for additional shipments expected there.

The Consolidated Water Power and Paper Company this winter will complete selective logging on 18 forties it owns in Langlade county near Summit Lake. Cutting has been in progress for more than a year under the direction of E. B. Hurst, chief forester. The cut of the last season amounted to approximately 2,000 feet of peeled hemlock logs, one million feet of hardwood, 1,200 cords of pulpwood, and more than 15,000 railroad ties which were prepared at the company's own mill at Summit Lake. All slash has been removed so as to eliminate fire hazards. The tract will not be left for about twenty years before another cutting will be made. When the logging is completed, the camp will be moved to another tract of 12 forties owned by the company northeast of Summit Lake.

S. F. Shattuck, vice-president of the Kimberly-Clark Corporation, has retired from the presidency of the National Manufacturers Bank of Neenah, Wis., after serving in that capacity for five years. S. N. Pickard, who has been executive vice-president, succeeds him on Mr. Shattuck's own recommendation that the trend is more and more toward the president acting as the chief executive officer. Mr. Shattuck continues as a member of the board of directors and was elected one of the vice-presidents. Resources of the bank have been increased approximately $1,000,000 during the last five years.

CANADIAN PULP & PAPER ASSOCIATION CONVENES

(Continued from page 15)

The 1936 production represents a recovery of 1,276,283 tons, or 66.7 per cent from the depression low point of 1932, and at the present time newsprint mills are operating at higher ratios than at this time last year, and, in addition ended the year 1936 with a substantial reduction in stocks as compared with the year ending 1935.

"The newsprint industry in 1936 operated at a capacity of 92.5 per cent of the active available capacity and during the last three months of 1936 operated at 91 per cent of rated capacity, and as the record of many years shows, 93 per cent of capacity is about all that the industry can produce on the average even under the best conditions.

"The principal problem concerning this industry, the solution of which cannot long be delayed, is the necessity of establishing a sound basis of operation for existing capacity that will pay a return on its invested capital, while at the same time providing reasonably steady employment for its large number of workers. Such a plan must take into consideration wise and constructive policies looking to the economic expansion of the industry and the development of its forests.

Rapid Growth of the Industry

"The pulp and paper industry has developed in a very short period of time from a position of minor importance till it is now the principal manufacturing industry of Canada. This industry barely existed in 1900: just began to get underway in 1912 and 1913; and by 1920 the production of newsprint, sulphite, sulphate and various other grades of pulp and paper had materially increased; by 1929 pulp and paper was the major manufacturing industry of Canada.

"Following 1929, production decreased during the depression to about 41 per cent of capacity, but despite this, under recovery conditions consumption increased so rapidly that in 1935 our production was in excess of our previous high record of 1929 and, as previously indicated our total production of pulp and paper in the year 1936 established a record. A few figures will show that this tremendous expansion has meant to the economic life of Canada.

"Using 1935 statistics as a basis, this industry disbursed as follows:

Total wages and salaries	$54,700,000.00
Total materials and supplies	19,400,000.00
Fuel in the form of coal and electric steam	10,800,000.00
Electricity purchased for motive power	15.871,000.00
For transportation—about	25,000,000.00

"The rapid growth of this tremendous source of income during the comparatively short period of twenty-five years, and despite a major war and a major and minor depression, has been a tremendous aid to the welfare of Canada. It is a notable fact that the gross contribution towards a favorable trade balance resulting from the pulp and paper industry amounted in 1935 to $112,235,000 out of a total favorable balance of $192,000.00.

Need for Co-ordination

"The development and expansion of this industry was too rapid to permit proper integration of the industry as a whole. However, resources of the industry were directed towards meeting the constantly increasing demand for production, and all that effort was individualistic in its objective. There was little time to consider possible and necessary co-ordination within the industry and with other industries and with other associations interested in the products of the forests. There was not even time to thoroughly investigate the processes in mills and in the woods operations, so that empirical rules rather than fundamental knowledge governed most operations. Because, however, the demands of the industry did require some co-ordination various associations were developed to investigate some particular phase of the general subject of our mill and forest operations. In general, these groups have worked independently of each other and with very little regard for the relationship between their problems and with all other similar organizations. In consequence, there has been very considerable dissipation of effort.

"It is essential to the future well-being of the forest products industries that the efforts of these various associations be properly directed and co-ordinated in the future. This does not mean simply co-ordination within the industry itself, but co-ordination between this industry and other forest product industries and between both these groups and the Dominion and Provincial Governments. Only in this way can we ensure that wise and constructive policies shall be followed in the interest of the industry and of our basic raw material, the forests. At the present time the industry is contributing a considerable sum of money through these various associations to a great variety of activities in the industry. There is no definite information as to how much this amounts to, but it is probably somewhat in excess of $1,500,000.00 per year.

"I have no reliable figures of the amount of money spent by the respective Provinces in the interest of the pulp and paper industry including their forests, but I have some figures with respect to the amount contributed by the Dominion Government. It is estimated that in 1936 the Dominion of Canada contributed to various branches of industry in Canada, as follows:

Agriculture—about	$10,000,000
Mining industry—about	4,500,000
Fishing industry—about	1,800,000
Forest industry—about	426,000

(of which there was allocated for pulp and paper about $40,000.)

"Your Executive Council has been giving consideration to this problem, and I strongly urge upon the incoming Executives that they give careful and urgent attention to some plan for the co-ordination of the various associations in this industry which are dealing with the industry's problems.

"During the past year your Executive Council has had to deal with a number of important problems in connection with our timber holdings, with tariffs and with matters relating to the Dominion Government. We have had a number of meetings and many discussions with reference to the continuation and enlargement of research work in this industry. It is important to the welfare of this industry that the principal executives in the industry shall be fully and well informed on these major problems through this Association. The various Sections and Committees of the Association have had a very active year.

"The Executive Council realizes that the Research Institute is inadequately financed owing to the depressed condition of the pulp and paper industry, but there is a

great deal of work to be done which cannot be undertaken until sufficient funds are available.

"The Tariff Department and the various Sections of the industry interested in grades other than newsprint have had a large number of meetings, and have been very active with the problems of their own Sections. The secretary-manager visited England to consult with the British Paper Makers Association on tariff matters and to continue our cordial relations with the members of the industry in that country."

Newsprint Section

R. K. Martin, the secretary of the Newsprint Association of Canada, presented the report of the Newsprint Section, which stated that in general the industry had completed a year of sharp improvement in production, with prospects of substantial further improvement in 1937. But, he continued, the industry remains beset by fundamental weaknesses of selling and delivery methods which have resulted in continued uneconomic operations and which have delayed the improvement in net earnings now long overdue.

Preliminary reports of production by Canadian mills show a 1936 total of 3,109,599 tons, an increase of 437,310 tons or 15.9 per cent over 1935 and 461,772 tons or 16.9 per cent higher than 1929, which were the two previously high years in the industry's history. This figure of 1936 production represents a recovery of 1,276,283 tons or 66.7 per cent from the depression low point of 1932.

Domestic contract prices in 1936, however, remained over $7.00 a ton below the 1932 average and were only $1.00 a ton better than the 1934-1935 level, which was the lowest price in some thirty years. Newsprint prices throughout the world remain far behind the average price recovery of other commodities.

Three of the largest Canadian companies continued to operate in bankruptcy throughout 1936. One bankrupt company was reorganized early in the year but has since deferred payment of its bond interest. Three other Canadian companies completed plans relating to default of bond interest.

Present indications for 1937 point to continued increase in demand for tonnage, with the Canadian industry's probable operation ratio at 85 to 90 per cent of rated effective capacity compared with 82 per cent for the record year just closed. The industry is also entering 1937 with some slight price improvement over 1936, domestic contract prices at present being $1.50 a ton better than in 1936 while prices in certain overseas markets have improved substantially and continue upward. The slight total price improvement to date, however, is considerably offset by rising costs of labor and materials.

Mechanical Pulp Section

D. G. Kibbey, chairman of the Mechanical Pulp Section, stated that following the organization of this section in October, 1935, over 90 per cent of the industry was now represented in the membership.

The market price of groundwood at that time, the report continued, was approximately $23.00 delivered in Eastern United States and $19.00 at Great Lakes ports. Scandinavian groundwood was being sold at $18.00 Atlantic ports. All of the Canadian manufacturers were confronted with a demoralizing situation. Each mill made every effort to maintain its production and thereby relieve the unemployment situation, but every ton of pulp sold meant further losses. The members of the Mechanical Section have cooperated to the greatest extent in combining their efforts to correct this situation. Some difficulties arose at times, but in each instance they were overcome.

The member mills for the first ten months of 1935 shipped a total of 78,460 tons of which 55,845 tons were exported to the United tSates. For the same period in 1936 the mills shipped 93,430 tons of which 79,470 tons were exported to the United States.

Due to the continued improvement in economic conditions in Canada, the United States and in many foreign countries, the demand for mechanical pulp has increased and Canadian producers have been able to share in the rise in commodity prices generally.

The market price today of Canadian groundwood is $30.00 in New England and New York, $26.00-$27.00 at Great Lakes ports and $24.00 Atlantic ports. Scandinavian groundwood has advanced correspondingly.

The market price in the United Kingdom has advanced rapidly, present quotations for immediate shipment being £5. 5s. Scandinavian mills are reported to have formed a combine to force an improvement in the British market. Efforts are being made to place a considerable tonnage for England with Canadian mills.

Production of mechanical pulp in Canada appears to about equal demand. Indications are that the groundwood market will advance still higher. There is a tendency of merchanical pulp to follow the market of chemical pulps. This condition will probably continue until such time as production exceeds demand.

Chemical Pulp Section

F. G. Robinson, chairman, reported that during 1936 demand for both bleached and unbleached sulphite pulp was active in North America following the upward swing of general business. In England consumption increased considerably, and in European countries there was a resumption of normal demand; Japan increased its consumption substantially. The result was some increase in prices, but not sufficient to compensate increased costs.

It is regrettable, he said, that long term price commitments made by European pulp producers retard orderly adjustment of prices of sulphite pulp throughout the world, especially in North America where it is the practice of domestic producers to adjust prices on a quarterly basis. Long term fixation of prices leads to speculation by buyers, injecting into a large industry elements of uncertainty, the absence of which would be advantageous to both buyers and sellers. More frequent price adjustments would eliminate large fluctuations and inequalities in prices, and the otherwise unavoidable tendency to speculate both as to tonnage and price.

At the year end there exists some shortage of the better grades of both bleached and unbleached sulphite pulp, but increased production being brought into the market during 1937 will likely satisfy all requirements and restrain abnormal price increases, although increases in prices are justified by higher wage and other costs in both North America and Europe.

Exports of Canadian bleached sulphite in the first eleven months of 1936 totalled 322,500 tons, as compared with 286,083 tons in 1935.

Exports of unbleached sulphite in the first eleven months of 1936 totalled 104,841 tons, as compared with 92,477 tons in 1935.

Paper Board Section

Eighteen companies were members of the Board Section, L. F. Winchell, the chairman, reported, and all of them had enjoyed a greater production than in the year previous, resulting in the biggest output of paper boards in the history of the industry.

The grand total shipments for eleven months of year 1936 amounted to 290,641 tons, as compared with 264,081

tons in the same period in 1935, an increase of 10 per cent. Of this total 241,891 tons were shipped for domestic consumption, as against 212,032 tons in 1935, an increase of 14 per cent, and 48,750 tons were exported to other countries, as against 52,049 tons in 1935, a decrease of 6 per cent.

A further breakdown of these figures in tons would show the following industry growth trends:

	1935	1936	Gain
Container Board Grades	83,585	94,911	13.5%
Boxboard Grades	89,817	94,803	5.5%
All other Grades	38,630	52,177	35%

During the eleven month period, imports of board were increased by 487 tons over 1935, having a dollar value increase of $67,644, which reflects an increase of 9 per cent in tonnage and an increase of 16 per cent in dollar value.

Imports of boxes, cartons and containers were likewise increased during the year to 887 tons over 1935, with a dollar value increase of $67,644. In percentage, the tonnage increase of boxes, cartons and containers imported amounted to 64 per cent, and the dollar value increase to 40½ per cent.

Prices during the year remained fairly constant in comparison with 1935, the figures being no higher on any grades, and, in some cases, due to the new Reciprocal Trade Treaty with the United States, prices have been lessened, particularly on container grades, where a supply has gone into production for export shipments.

It is thought that practically all mills have bettered the situation on labor during the year, and, likewise, that all are experiencing higher costs, and are, in fact, anticipating even further increases in costs during 1937.

Book and Writing Section

A. P. Jewett, reporting for the Book and Writing Section, had some interesting remarks to make on the effect of the reciprocity agreement with the United States on book paper. This agreement, he said, provided for the admission free of duty of many magazines and periodicals which for some years previously had been dutiable. During the period prior to the consummation of the treaty referred to some thirty or more of these U. S. publications using an estimated minimum of 5,000 tons per annum of various printing papers and other local materials and labor were printed and produced in Canada. Furthermore, the trend was to increase rather than decrease this practice. A year has now elapsed and I can only report that but one of all these magazines remains in Canada.

A further effect of the treaty referred to is the increased competition to which our customers, the Canadian magazine publishers, were exposed. The treaty itself reduced the prevailing rate of duty on ordinary magazine papers from 25 to 22½ per cent, but our Government further conceded the publishers a drawback of 50 per cent of the existing rate, or, in other words, a net rate of 11¼ per cent. This is held to be insufficient to equalize production costs, and in the absence of more reasonable conditions being restored, the manufacturers of book paper may have to seek relief through lower tariff on their own supplies and materials.

From September onward the shipment of book, bond and writing papers showed a most decided improvement of about 15 per cent on the average, and from present indications it was expected that this trend would continue. On the whole, while some of the events of the year were disturbing, the members look forward to the future with confidence.

Tag Section

G. W. Pauline, chairman, in his report, said: This is a new Section of the Association, which was formed to deal with grades and questions that did not properly fit in with any other Section. Several meetings were held during the year in Toronto and Montreal, and some existing inconsistencies were corrected. Prices held firm until December, when rising costs of raw materials resulted in a general increase on all grades of Tag Stock. The outlook for 1937 is very promising, but the heavy demand for pulp, coupled with an apparent shortage, may result in still further increases before the year is very far advanced.

Tissue Section

George Carruthers, chairman, reported that the eight Canadian mills which manufacture tissue and tissue specialties did not obtain sufficient business during 1936 to enable them to run to capacity throughout the year; however, because of the present business trend the outlook for 1937 is more promising.

Light Weight Specialties Section

G. L. Carruthers, chairman, reported that the manufacturers of Light Weight Sulphite papers have noted some improvement in their position, particularly during the last two months of 1936. While the market has strengthened somewhat, in line with the general trend in the industry, there is still greater productive capacity than demand; and imports of waxing paper for re-export, continue to constitute a problem which the industry has not yet successfully solved. We believe, however, that we may look forward to a firm, and increasing, demand for light weight grades during the year 1937.

Coated Paper Section

R. P. Reid, chairman, reported that the question of imports of Coated Papers has been given considerable study during the year and while the Government statistics show an increase in imports over the preceding year, it is encouraging to note that the industry has recorded a slight increase in tonnage in both production and sales over 1935. The volume, however, it still far below what should be its normal yearly consumption. It is hoped that the year 1937 will see a reduction in these importations and a greater demand for Canadian made Coated Papers.

Wrapping Paper Section

Reporting for this section, J. O. Chenevert, chairman, said: According to information available, the consumption in Canada of Wrapping Papers of all grades, in the year 1936, showed a moderate increase over that for the year 1935. The tonnage of Wrapping Paper consumed in Canada still remains far below the productive capacity of the Canadian wrapping paper mills. Thus competition is keen, but by cooperation, conditions have remained stable. The signs for the year 1937 point to further improvement over the past year.

Technical Section

H. J. Rowley, chairman, reported that the Technical Section had had a successful year and had increased its membership by 17 to 249. The Section now had 12 standing committees, each of which had been active in its field. Of special note, however, were the questionnaire data that had been collected and compiled by the Waste, Sulphite, and Newsprint Committees. These, coupled with the questionnaire data from mills secured by the Groundwood and Heat & Power Committees during 1935, placed

at the disposal of contributing mills, and of the Section Committees, a wealth of data on equipment and operation, and so secured for those interested a clear picture of existing industry conditions and so also provided a sound basis for future alteration or development study.

Reference was made to the outstanding success of the joint Summer Session with T.A.P.P.I., at which some 300 members of the two organizations profited not only from two constructive technical sessions, four "Elysian days" on the St. Lawrence and the Saguenay, but the much-appreciated hospitality of various industrial groups in the path of their voyage.

The Executive Council recommended that immediate effort be made to consolidate the management of all research effort in the building under one head and the appointment of a Technical Secretary to the Section. Another recommendation was that a translator skilled in the handling of industrial German and the Scandinavian languages be engaged and that machinery be established to care for the distribution of abstracts by him from technical literature.

Woodlands Section

M. R. Kane, chairman, reporting for this Section, said it was in a state of continuous growth of its activities and had increased its members to 141. After detailing the research work carried out by the Section, Mr. Kane said:

While the work of the Woodlands Section has to do mostly with the increase in efficiency of our logging practices and with economical production of adequate raw material for the mills, much time has been devoted by the headquarters, especially of late also, to the phases of forest management in Canada which are related to the future wood supply and which were formerly comparatively neglected. Through dealing with various agencies concerned, deliberate efforts have been made by this Section to improve the foundation for establishment of a country-wide forest policy that would assure the security of adequate wood supply on which this industry in dependent. This involves not only forest protection but some even more complex problems, such as practical silviculture in its relationship to economics and to our present technique of logging. There are definite and increasing indications that our preparedness to face these problems effectively and to actively participate in their practical solution is of vital importance to the interests of the industry.

Indirectly related to this is the plan for calling a Canadian forestry congress, probably within a year's time, which plan was instigated by this Section and is now under consideration.

Pulp and Paper Research Institute

Harold Crabtree, chairman of the Joint Administrative Committee of the Canadian Pulp and Paper Institute, gave a lengthy report dealing with the post-graduate training of research chemists of McGill University, and with the experimental work carried out in the laboratories of the Institute. In the report it was mentioned that work on the Johnston Pulp Fibre Classifier was brought to a stage which permitted active steps to be taken toward manufacturing and marketing the device for the benefit of the pulp and paper industry in Canada. It was found that reasonable separation according to fibre length was effected in a reproducible manner by the classifier, the work including not only groundwoods but sulphite pulps, both beaten and unbeaten.

Canada's Forests Threatened by Rust and Sawfly

Dr. H. T. Gussow, Dominion botanist, at a luncheon under the auspices of the Woodlands Section, said that the white pine blister rust had now spread throughout the whole of Canada, and unless radical action were taken, it would destroy Canada's valuable empire of softwood in from 30 to 50 years. The disease, he said, is not transmitted from one tree to the other, but requires an agency to carry it. The intermediate hosts in this case are wild gooseberry and currant plants, and even the domestic black currant. Eradication of the plants would cost but 40 cents an acre, the speaker estimated, saving many millions of dollars for Canadians. It is not only the young trees which are affected, he continued, but white pine up to 150 years of age.

"What is the good of spending all kinds of money on research work, what is the good of telling you all this, if there isn't a soul in this country practising what we preach? Anyone who is able to induce the whole pulp and paper industry to take action will have done a great thing for Canada."

Following Dr. Gussow's warning, there came a dispatch from Ottawa stating that another serious pest was the spruce sawfly, which, unless checked, would destroy all the nation's spruce in 25 years, causing damage of about $10,000,000,000.

Department of Agriculture entomologists, struggling to fight the sawfly plague, have been breeding parasitic wasps at a Laboratory in Belleville, Ont., since last spring. Agriculture Minister Gardiner told the House of Commons this week about 20,000,000 of the little insects were available for distribution in the forests.

The spruce sawfly infestation started in the Gaspe Peninsula and spread westward and southward with considerable rapidity. Last summer it had reached Connecticut in rapidity. Last summer it had reached Connecticut in the south, was reported to have been found on the north shore of the St. Lawrence River and as far west as the North Bay district.

Scientists hope the parasites will be able to check its advance.

Premier Duplessis Addresses Members

Premier Duplessis, in a speech frequently punctuated by enthusiastic applause, addressed the members of the Association at a luncheon on Thursday. He showed a lively interest in the industry. Announcing that the Government of the Province of Quebec hoped to call a congress of all those interested in the pulp and paper industry, he said the object of this congress would be to assist in drawing up laws that would be "fair and honest and protect everybody concerned." Stressing that he did not believe in unnecessary regulation, he said, "Our law should be wide enough for every noble and honest initiative to travel on the avenue of progress." He told the gathering that:

His Government will not allow any new pulp or paper mills to be built until all those now constructed, including the mills at present shut down, are fully occupied;

"All honest capital (referring especially to that from outside the country) will be well protected, I give you my word;

"I don't believe in daily government interference in private enterprise;

"We must protect our forests; forestry conditions in Quebec at present are serious."

Citizens of Quebec come first on the list of those who should benefit from the province's natural resources, those of the whole Dominion next, and the interests of people in other countries last.

Telling of the "important place," the pulp and paper industry occupies in the province and in Canada, the Premier at the outset of his address declared that Canada produces, according to the latest available statistics, 36 per cent of the whole tonnage of paper in the world, Britain comes

second with about 13 per cent and the United States third with some 12 per cent. About half of Canada's production comes from this province.

About 60 per cent of the industry's capital comes from the United States, and it is to be regretted, said the Premier, that more did not come from Great Britain, that she did not realize the province's possibilities.

Past policies had helped to make the industry's present problems, "very complicated." There was over-capitalization, "which is a kind of inflation," and forestry conditions in the province are serious. The only way to solve these problems and others is by working together.

Pledges Co-operation

"There can be no enduring results, there can be no prosperity, unless everyone co-operates. We, the Government, are willing to co-operate to the fullest extent."

Here the Premier reiterated previous promises that the Government will not allow any new pulp and paper mills until all those already built are on a satisfactory basis again. "There is no use trying to raise the children of your neighbor until your own children are well looked after." He appealed to the industry to see to it that no mills are kept idle merely to prevent others being built, and so shut out competition.

Everyone who invests money in a business is entitled to a fair return, Premier Duplessis continued. A fair return constitutes not only interest on the money invested—the brains and the skill of those who invest it, and the risk they take, must be taken into account.

The paper industry is important, "not only for the money that is invested in it, but for the work it provides, for the human capital invested in it. The money should serve, not rule. It should be ruled by the brain, and the brain should be ruled by the heart," said the Premier.

Stressing that legislation, which would be in effect over a long period, and give the industry more stable conditions to work on, was more fair than regulation, "which can be changed every day." Premier Duplessis told of his Government's policy not to interfere with business, in the pulp and paper field, any more than was necessary.

Ambassador of Goodwill

Holding out the olive branch in Ontario, the Premier continued: "There is no reason why other provinces should not pull together with us and make laws not only for the good of the paper industry, but for the prosperity of all."

The pulp and paper men should be "ambassadors of goodwill," the Premier thought.

"Therefore, I give you a message: The Province of Quebec is willing to go to every possible limit within the bounds of justice to co-operate with every other province."

Because Quebec was anxious to work first with the other provinces, it did not mean that foreign capital was not wanted, or that it would not be protected.

"In Quebec, honest capital can be sure of one thing, we will give you security and stability. However, there can be no security and stability not based on justice for everybody concerned."

To further develop the industry there should be more facilities for technical training, Mr. Duplessis believed. There is a number of technical schools in the province now, but these are generally concentrated. It was his plan to have small technical schools established in proximity to the mills themselves, so that the worker could receive the benefits of additional training, and the mills could receive the benefits of more highly trained workers.

Also, there should be a system of "forestry colonies," to make sure the regulations regarding cutting and other phases of the industry are followed. In this way the matters of stumpage and ground dues, "would be according to the facts." "There is talk of artificial reforestation," said Mr. Duplessis, "but there is nothing so good as natural growth." Therefore this natural growth of the forests should be protected by someone on the spot, instead of trying to do it from many miles away in an office.

American Capital

The Premier concluded with the thought that there must be a middle course: The rights of Canadians must be protected, but nothing must be done to antagonize the United States, whence comes the capital.

"As a result of silly threats some years ago the big paper men in the United States went South and worked on the development of the Georgia pine."

The problems of the industry are so great that there is no room for bickering or "petty politics," but all must work together, extending the fullest measure of co-operation for the benefit of the industry, the Province and Canada.

Dominion Minister's Address

Hon. T. A. Crerar, Minister of Mines and Resources in the Federal Government addressed the members at a luncheon on Friday. He promised the co-operation of the Federal Government in measures for the benefit of the industry, particularly stressing the work of forest conservation.

Of the three things which destroy forests, fire, insects and wasteful cutting, there is none which can't be checked, he said. The federal Government, through its forestry stations throughout the country and by other methods, is doing much to control the losses from these sources, but the forests are primarily under the control of the provinces, and it is up to the latter to do most of the work. It is here that the need for co-operation is shown most forcibly, he said.

The industry realizes more than ever the value of sound methods of conservation, but a still keener "realization by the executives of the various companies of the value of the Pulp and Paper Institute's work would certainly show up in their balance sheets."

The federal Minister closed with the remark that he was "much struck," with the address of Premier Maurice Duplessis, given before the association Thursday. "It showed vision and a grasp of the problems of the industry," Mr. Crerar declared.

KVP To Install Yankee Machine

KALAMAZOO, Mich., February 1, 1937—Authorization for the management of the Kalamazoo Vegetable Parchment Company to proceed with the installation of a new Yankee paper machine was granted at a recent meeting of the board of directors of the company. This paper machine will make such papers as cannot be made on an ordinary straight Fourdrinier machine, Ralph A. Hayward, president, stated.

It will be used, he stated, to make paper for bread wrappers, soap wrappers, and fruit wrappers, a line which the company is now extensively engaged in supplying. Special treatment and printing of the paper will be required after coming from the Yankee machine before it is ready for service. Such an installation Mr. Hayward pointed out, can be made at a minimum cost to the company, since the power plant, water filters, and other necessary contributory services are of sufficient capacity to care for the new machine without expansion. It is the opinion of the management that the installation will prove a highly profitable one.

Obituary

John L. Barchard

John L. Barchard, president of the Hummel and Downing Company, Milwaukee, Wis., died at 11:30 Friday evening, January 29, at the Wisconsin General Hospital, Madison, Wis., following a heart attack. He was prominent not only in the carton and boxboard industry, but also in civic activities.

Mr. Barchard, who was 55 years old, went to the state capital Thursday of last week to attend hearings on a bill creating a state labor relations board, a subject in which he was vitally interested. During the evening he attended a conference with Governor Philip F. LaFollette at the executive mansion, and was stricken with a heart attack while there. The governor summoned an ambulance to convey him to the hospital. Physicians pronounced his condition critical, and he failed to survive. Mrs. Barchard was at his bedside when he passed away.

Born in Toronto, Ont., Mr. Barchard learned box manufacturing in a factory operated by his father. He went to Chicago in 1903 to become associated with the Chicago Mill and Lumber Company, later part of the Container Corporation of America. While in Chicago, he sponsored water sports carnivals and officially opened the athletic stadium during the World War at the Great Lakes Naval Training Station. He associated himself in 1921 with the Hummel and Downing Company in Milwaukee, where he became its president and general manager, and was responsible for its rapid growth in recent years.

When the employment situation became acute during the recent depression, Mr. Barchard advocated a six-hour day "at living wages" and in 1932 instituted the program at the Hummel and Downing mill. He served on a state committee to consider depression employment, and was chairman of the Milwaukee "share-the-work" program.

Mr. Barchard served as president of the Wisconsin State Chamber of Commerce shortly after its organization, and was instrumental in building the organization to its present strength. He was one of the originators and first president of the Milwaukee and Wisconsin Exposition, where the state's paper manufacturing activities received prominent display and recognition. The exposition is now held annually. He organized a district golf association in Milwaukee, was active in the Milwaukee Horse Show Association, and an ardent supporter of Citizens' Military Training Camps.

The widow and a daughter, Mrs. William H. Smythe of Milwaukee, survive him.

W. C. Staley

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, February 1, 1937—W. C. Staley, 77 years old, associated with the American Paper Company for a number of years, died last Sunday at his residence, Second and Dow streets, Tippecanoe City, Ohio, near Dayton.

He was the vice-president and a director of the company until his health failed; and lived in New York when actively identified with the paper firm. He had resided in Tippecanoe City for twenty years and was well-known in business circles.

Surviving are one son, Alben, Birmingham, Mich.; and a daughter, Mrs. Elizabeth Dickey, at home. His wife preceded him in death a number of years ago.

Funeral services were conducted at the Staley residence Tuesday at 2 p. m. by the Rev. Mr. Riegle of the Lutheran church. Burial was in Maple Hill cemetery.

James Dederick

James Dederick, aged 73, retired treasurer of the Martin Cantine Company, Saugerties, N. Y., died suddenly at the Park House, St. Petersburg, Fla., January 25. At the time of his death Mr. Dederick was secretary of The Tissue Company, another Cantine interest.

A native of West Camp, N .Y., he went to Saugerties in 1888 and associated himself with the late Martin Cantine as his private secretary. He continued this association until 1923 when he retired from active business, maintaining, however, a large interest in the firm's activities. He was a trustee of the Saugerties Saving Bank and had served the Village of Saugerties as clerk and as a member of the Board of Education.

His wife, a daughter and son survive. Funeral services were held from his late home in Main street, Saugerties, January 29.

Fred Smidt

Fred Smidt, 66 years old, of 187 81st street, Brooklyn, N. Y., assistant sales manager of the International Paper Company, with which he had been connected since 1898, died in Bay Ridge Hospital Wednesday, January 27, after an illness of about a year. Surviving are his wife, Mrs. Margaret Smidt, and a sister, Mrs. Helena Plate.

W. M. Gordon to Address Merchants

It is announced that Watson M. Gordon, of the well known advertising agency of Doremus & Co., will speak on "The Paper Merchants' Merchandising Problems" during the coming Convention of the National Paper Trade Association at the Fine Paper Division meeting to be held Wednesday afternoon, February 24.

Mr. Gordon is a national figure in advertising circles with a very considerable record as a publicist on such topics. For many years he was advertising manager of S. D. Warren Company and supervised all their merchandising activities. He is still a member of their Board of Directors and holds membership in the Association of National Advertisers and the Advertising Club of Boston, which organization he has served as vice-president and director.

With Doremus & Co., Inc., Mr. Gordon will be in charge of merchandising and sales promotion plans and will be a member of the agency's recently organized Creative Policy Committee.

Convention Dinner Party

As a pleasing surprise the National Paper Trade Association of the United States, Inc., has been able to make satisfactory arrangements for another Convention Dinner Party at the French Casino, New York. A new show has just been put on which is generally regarded as the best they have ever had. The association has been able to reserve preferred space on the floor instead of in the balcony as heretofore and a dinner and entertainment that will be highly satisfactory—by far the best for the money that can be found—is promised.

The party will be held Washington's Birthday evening, Monday, February 22, at 7 p. m. The show goes on at 8 o'clock. Tickets will be $3.75 each which includes tips and tax. Tables of various sizes will be available and all tables will be good, but earliest reservations will get first choice.

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CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Hartsville, S. C.—The Sonoco Products Company, manufacturer of paper board products, chip board, paper tubing and kindred specialties, has approved plans for new addition to mill, comprising a main two-story unit, 125 x 425 feet, for expansion in production department, and two-story building, 60 x 325 feet, for storage and distribution. A new power plant also will be built, to supplement present power supply now secured from Carolina Power and Light Company. General contract for erection has been awarded to the Fiske-Carter Construction Company and work will begin at once. Entire project will cost close to $500,000, with equipment. James L. Coker is president.

Orange, Tex.—The Orange Pulp and Paper Company, manufacturer of kraft wrapping papers, etc., has plans nearing completion for new one-story addition to mill, to be used primarily for storage and distributing division. Bids will be asked soon on general erection contract. New unit is estimated to cost over $40,000, including equipment.

Everett, Wash.—The Soundview Pulp Company, manufacturer of bleached sulphite pulp, is considering early construction of another unit at local mill, making the third unit of the plant. It will consist of several one and multi-story buildings, estimated to cost close to $1,000,000, with equipment. Immediately following approval of project by board of directors in February, it is expected to begin work, having the new unit ready for service in June. Company is now completing the second unit of the plant, previously referred to in these columns, and expects to place in service in 30 to 60 days. It consists of three large buildings and will be equipped to increase rated capacity from 6000 to 9500 tons per month, representing a reported investment of about $2,000,000. The Austin Company, Dexter-Horton Building, Seattle, Wash., is general contractor for erection. Leo S. Burden is general manager.

Pawtucket, R. I.—The New England Paper Tube Company, Pawtucket, manufacturer of paper tubing and kindred paper specialties, has closed negotiations for purchase of former local Mill A of the Manville-Jenckes Company, manufacturer of textile products. The property has been in possession of the city for a number of months, from which the acquisition was made, and will be occupied for plant by the first noted company. Facilities will be provided for large capacity.

Chicago, Ill.—The Celotex Corporation, 919 North Michigan Avenue, manufacturer of wall board products, insulating board, etc., has filed notice of increase in capital from 500,000 to 750,000 shares of stock, no par value, for general expansion in operations.

New Haven, Conn.—The New Haven Pulp and Board Company, East street, will carry out an expansion program in power department, in addition to mill improvements, recently referred to in these columns, and has plans under way for new addition to power plant to provide for large increase in present capacity both in steam and turbine-generating departments. A new boiler unit will be furnished by the Bigelow Company, 92 River street, New Haven; awards for other equipment will be placed soon. New addition is estimated to cost close to $250,000, with power units. Frederick L. Smith, 21 East Fortieth street, New York, N. Y., is architect.

Winona, Minn.—The Nebraska Fibre Corporation, J. M. Johnson, Hartington, Neb., president, manufacturer of fiber board products, flexible board materials, etc., has acquired property of the Union Fibre Company, Winona, and will establish a plant at that place. Structures will be remodeled and improved, with installation of new equipment. Work will be placed under way at early date and is reported to cost over $50,000. J. A. Johnson is secretary.

Plymouth, Mich.—The Burroughs Adding Machine Company, 6071 Second street, Detroit, Mich., has awarded general contract to the Esslinger-Misch Company, 159 East Columbia street, Detroit, for new plant at Plymouth, recently referred to in these columns, to be used for production of accessory products of company, with division for production of roll papers as used on adding and tabulating machines, as well as kindred paper goods. Complete plant will be of one and five-story type, 135 x 600 feet, with power house, 100 x 175 feet. Superstructure will be placed under way at early date, with plant scheduled for completion next fall. It is reported to cost close to $3,000,000 with machinery. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Belleville, N. J.—The Beisler-Weidmann Company, 233 Cordlandt street, paper products, has acquired adjoining one-story industrial building on adjoining site at 221 Cordlandt street, totaling about 13,000 square feet of floor space, and will improve and equip for new addition, to be used for storage and distributing service.

Memphis, Tenn.—The Lehon Company, West Forty-fourth street and South Oakley avenue, Chicago, Ill., manufacturer of prepared roofing products, has consummated plans for new branch at North Memphis, recently referred to in these columns, and will begin work at early date. Property has been acquired on TVA street, near Thomas street. New plant will comprise several one-story units under one roof, 100 x 500 feet, and will cost close to $175,000, including equipment. General contract for erection has been awarded to Thomas & Belz, Memphis. A. G. Leonard is president.

Chicago, Ill.—The Acme Novelty and Manufacturing Comany, 3010 West Ainslie street, recently organized with capital of 100 shares of stock, no par value, plans operation of a local paper converting plant for the manufacture

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of a line of paper specialties. The incorporators include M. M. Gluskoter and Jack Fried. Company is represented by Goldman & Packler, 105 West Madison street, attorneys.

Los Angeles, Cal.—The National Automotive Fibres, Inc., 19925 Hoover avenue, Detroit, Mich., manufacturer of fiber products for automotive service, has selected property at Los Angeles, and plans early construction of new branch plant. It will comprise several one-story units, estimated to cost close to $250,000, including equipment. Facilities will be provided for employment of about 200 persons. R. A. Dunnan will be manager at the new plant.

Chicago, Ill.—The Lanzit Corrugated Box Company, 2425 South Rockwell street, manufacturer of corrugated boxes and containers, has leased a three-story building at 2500-40 West Twenty-fifth street, used for storage and warehouse service, totaling about 64,000 square feet of floor space, to the Liquid Carbonic Corporation, 3100 South Kedzie avenue, Chicago, for a term of years, which will occupy the structure for another line of service.

Crossett, Ark.—The Crossett Paper Mills, a Division of the Crossett Lumber Company, organized a few months ago to manufacture kraft pulp and paper products, has work practically completed on local pulp mill unit, in course of erection since last spring and is planning to begin production at the plant on or about February 10. The plant has been equipped for an initial capacity of 200 tons per day and will be stepped-up to this basis at early date. Employment will be given to about 360 persons in different divisions. The new mill will represent an investment of approximately $4,000,000 and was financed through an RFC loan, as previously reported in these columns. Erection has been handled by the Rust Engineering Company, Clark Building, Pittsburgh, Pa., which secured the general contract for the plant. Electric equipment was furnished by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. K. A. Forrest is general manager; Bruce Suttle will be superintendent at the plant.

Pretoria, South Africa—The South African Paper and Pulp Industries, Ltd., Pretoria, has plans under way for early construction of a new pulp and paper mill on local site. It will consist of group of large one- and multi-story units for pulp division and finished paper-making department, with storage and distributing buildings, power house, pumping station, machine shop and other mechanical divisions. Entire plant is estimated to cost over $1,500,000, and will require about twelve months for completion. C. C. Frey is secretary.

Joins National Oil Products Co.

Donald Price, Ph.D. has joined the National Oil Products Company research staff. He is well known for his work in synthetic organic chemistry and microanalysis, especially his contributions to the chemistry of the Methoxychalcones and Methoxybenzalcoumaraones and cycloparaffins. For a number of years Dr. Price was a member of the Columbia University faculty where in 1930 he received his doctorate and shortly afterward directed his efforts to industrial problems.

Dr. Price has had an exceptionally broad training both in this country and abroad having worked in collaboration with Prof. T. M. Lowry in England and Prof. K. Fajans in Germany. He also studied organic microanalysis in the laboratory of the late Prof. Fritz Pregl in Austria. Dr. Price has published a number of interesting papers. He is a member of the American Chemical Society, The American Association for the Advancement of Science and a Fellow of the Chemical Society (London).

National Paper Trade Program

The following is the preliminary program for the annual convention of the National Paper Trade Association to be held at the Waldorf-Astoria Hotel, New York, February 21-25, 1937:

SUNDAY, FEBRUARY 21

10:00 A. M. Meeting of Executive Committee

MONDAY, FEBRUARY 22

9:30 A. M. Fine Paper Merchandising Committee
9:30 A. M. Traffic Committee
9:30 A. M. Book, Offset and Groundwood Committee
9:30 A. M. Bag Committee
11:00 A. M. Cover Paper Committee
11:00 A. M. Survey Committee, followed by luncheon
2:00 P. M. Opening Session
4:00 P. M. Fine Paper Merchandising Committee
4:00 P. M. Committee on Seconds and Job Lots
4:00 P. M. Wrapping Paper Merchandising Committee
4:00 P. M. Box Paper Committee

TUESDAY, FEBRUARY 23

9:30 A. M. Writing Paper Committee
9:30 A. M. Gummed Tape Committee
11:00 A. M. Bristol, Blank, Board and Tag Committee
11:00 A. M. Tissue and Allied Products Committee
2:00 P. M. Fine Paper Merchandising Forum
2:00 P. M. Wrapping Paper Committee
3:30 P. M. Twine Committee
4:30 P. M. Fine Division—Governing Committee
4:30 P. M. Wrapping Division—Governing Committee
8:00 P. M. Board of Directors

WEDNESDAY, FEBRUARY 24

9:30 A. M. Fine Paper Merchandising Forum
10:00 A. M. Wrapping Paper Division Meeting
2:30 P. M. Fine Paper Division Meeting
2:30 P. M. Wrapping Paper Merchandising Forum
4:30 P. M. Survey Committee Forum
7:00 P. M. Round Table Dinner (Officers Local Assn.)

THURSDAY, FEBRUARY 25

10:00 A. M. Annual Meeting—National Paper Trade Association

Government Paper Bids

WASHINGTON, D. C., February 3, 1937—The Government Printing Office has received the following bids for 5,000 pounds of No. 1 gummed kraft paper: Reese & Reese, Inc., 8.5 cents per pound; United Supply Company, 9 cents less 2 per cent; Mathers-Lamm Paper Company, 9.8 cents; Whitaker Paper Company, 9.5 cents; Walker, Goulard, Plehn Company, 11.1 cents; R. P. Andrews Paper Company, 9.08 cents; Virginia Paper Company, 10.25 cents; and Old Dominion Paper Company, 9.49 cents.

John W. Goodspeed Dead

KALAMAZOO, Mich., January 30, 1937—John W. Goodspeed, Sr., 76 years of age, treasurer of the American Box Board Company, Grand Rapids, Mich., died at his home in that city on Saturday, January 16. Mr. Goodspeed was also president of the Goodspeed Realty Company and was prominent in civic affairs. He was born in Ypsilanti, Mich. Surviving him are four sons, two daughters, a brother and a sister.

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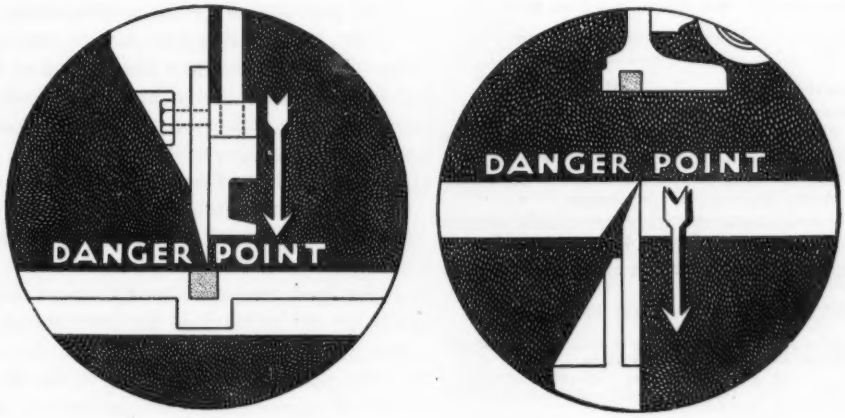

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PAPER TRADE JOURNAL
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COMING EVENTS IN THE PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Sixtieth Annual Convention and meeting, Waldorf-Astoria Hotel, New York, February 22-26.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Waldorf-Astoria Hotel, New York, February 22-25. Annual Luncheon, Waldorf-Astoria Hotel, Wednesday, February 24.

SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 23.

NEW YORK ASSOCIATION OF DEALERS IN PAPER MILL SUPPLIES, Annual Banquet, Hotel Commodore, New York, February 24.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria Hotel, New York, February 22-26.

NEW ENGLAND SECTION, Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Nonotuck Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION, Technical Association of the Pulp and Paper Industry—Fourth Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION, Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION, Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park-American Hotel, Kalamazoo, Mich.

AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION, Annual Meeting, Springfield, Mass., June 23-25.

CORPORATION SURTAX AND RE-EMPLOYMENT

Labor's job security and purchasing power will be impaired by the enforced distribution of corporate earnings under the 1936 Revenue Act, according to the forecast of Allen W. Rucker and N. W. Pickering, prominent business economists. A recent analysis, published by Farrel-Birmingham Company, Inc., under the title of "The Coming Effect of the Surplus Tax on Factory Employment" shows factory unemployment since 1923 to be concentrated in industries and states where corporation profit probabilities are lowest or declining fastest.

Pointing out that Massachusetts, New York, Rhode Island, Connecticut, Pennsylvania and New Jersey have suffered a decline in factory employment opportunity dating from 1923, the two economists show that this shrinkage has been coincident with the shrinkage in the percentage of corporations able to earn and retain a profit in the same period. A cross-analysis by industrial groups reveals five industries—Forest Products, Textiles, Leather, Stone, Clay and Glass, and Steam Railroads—in which diminishing employment occurred during the prosperity period, 1923-1929. Without exception, those were the only industries in which the percentage of profitable corporations were below or declining faster than the national average.

"When the trend of the percentage of corporations earning a profit is compared to the trend of factory employment, it becomes quite clear that in those industries and those states wherein industry finds it most difficult to earn and retain some surplus, employment suffers directly and substantially, even in prosperous times.

"The present Revenue Act as now drawn must have the effect of enforcing a distribution of surplus that otherwise might be invested in either recouping losses of the depression or improving plant and equipment and providing a 'cushion' for the next depression.

"The number of concerns enabled to so act inevitably determines the number of going concerns over the long term; and the total of factory employment is almost directly proportionate to going factories.

"At least two vital modifications and amendments to this Act are required in the interests of the national economy;

"An amendment exempting from the surtax that portion of corporation earnings which has been invested during the year in capital equipment, and/or which has been applied to capital losses incurred during the periods immediately preceding;

"A revision to provide for computation of statutory loss on the basis of recognized sound accounting principles instead of the present method of arbitrarily disallowing certain expenses and losses and thereby forcing the payment of an income tax when in reality no actual income has been earned."

MILLER-TYDINGS BILL APPROVED

The National Association of Manufacturers has endorsed the Miller-Tydings Fair Trade Bill, designed to make effective State Fair Trade Acts.

Raymond S. Smethurst, assistant counsel, presented the National Association of Manufacturers' views to a House Judiciary Sub-Committee at its first hearings on the bill. He expressed approval of the Miller-Tydings bill, and suggested strengthening amendments.

Excerpts from his testimony follow:

"This bill is primarily intended to make effective the policy of the several states which have enacted Fair Trade Acts. These Acts have two specific purposes: first, to permit certain restricted contracts to maintain resale prices on competitive commodities identified by trade mark, brand or the name of a producer; second, to prevent third persons who are not parties to such contracts from deliberately advertising or selling such commodities at less than the fixed resale price.

"The Miller bill is designed to give effect to the purposes of these state laws. It proposes to permit such contracts under Federal law when sanctioned by the laws of any state. In our opinion this proposed bill, while highly desirable in its purposes, does not go far enough to protect the various states in making their own laws effective.

"We suggest therefore that some provision should be written into this bill so that the policy of the various states could not be defeated by the deliberate price-cutting activities of persons not parties to contracts fixing resale prices. Congress should deny the channels of interstate commerce to price-cutters of this character.

"According to the present language of the bill the situation will inevitably result in which a contract fixing resale prices would be valid under both state and Federal law and yet a price-cutter not a party to the agreement could buy or sell such goods in interstate commerce without reference to the contract fixing the resale price. Only by closing the channels of interstate commerce to deliberate price-cutters can Congress really give effect to the policy of any state permitting contracts fixing the resale price of trade marked goods.

"The states themselves, even with Fair Trade Acts, have no authority whatever to extend those laws to interstate commerce or to protect local contracts from infringement from price-cutters buying and selling in interstate commerce. Consequently we suggest that this committee might well consider some modification of the present bill to give adequate protection to such agreements where sanctioned by the laws of any state."

Newsprint Production Increases

Production of news print in Canada during December 1936 amounted to 289,312 tons and shipments to 316,723 tons, according to the Newsprint Service Bureau. Production in the United States was 80,048 tons and shipments 81,708 tons, making a total United States and Canadian news print production of 369,360 tons and shipments of 398,431 tons. During December, 27,601 tons of news print were made in Newfoundland, so that the total North American production for the month amounted to 396,961 tons. Total production in December 1935 was 348,130 tons.

The total North American output of news print paper in 1936 was 4,439,876 tons, of which 3,190,599 tons were made in Canada, 921,408 tons in the United States, and 327,869 tons in Newfoundland. The Canadian output was 15.9 percent more than in 1935, that in the United States 1 percent more, with a loss of 2.3 percent in Newfoundland, making a total continental increase of 418,414 tons, or 10.4 percent. North American production of news print in 1936 was 45,000 tons more than in the previous record year of 1929.

Stocks of news print paper at Canadian mills were reported at 24,575 tons at the end of December and 14,328 tons at United States mills, making a combined total of 38,903 tons compared with 67,974 tons on November 30, 1936 and 40,327 tons on December 31, 1935.

M. S. McKinstry Elected President

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., January 23, 1937—Mark S. McKinstry, secretary-treasurer of the Illinois Envelope Company for a number of years, was elected president of the company at the annual meeting held January 19. He succeeds W. B. Milham who was elected chairman of the board. Neil Plantafaber, who was assistant to Mr. McKinstry, succeeds him as secretary-treasurer. All other board members were reelected.

Production Ratio Report

The following statistics are based upon paper production reports to the American Paper and Pulp Association:

COMPARATIVE MONTHLY SUMMARIES

Months	1936	1935	1934
January	76.1%	65.8%	.....
February	77.9%	70.0%	.....
March	76.0%	70.5%	.....
April	82.3%	70.0%	.....
May	81.6%	69.4%	.....
June	80.7%	72.3%	.....
July	77.3%	64.9%	.....
August	81.5%	70.9%	.....
September	80.5%	71.9%	58.2%
October	87.6%	75.6%	64.7%
November	88.0%	75.3%	61.7%
December	86.0%	71.2%	59.6%
Year	81.3%	70.5%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1937		CORRESPONDING WEEKS, 1936	
*January 9	92.2%	January 11	75.8%
*January 16	90.8%	January 18	77.1%
*January 23	88.0%	January 25	76.7%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks		
Ratio Limits	Jan. 9 1937	Jan. 16 1937	Jan. 23 1937
0% to 50%	46	49	35
51% to 100%	281	267	182
Total Mills Reporting	327	316	217

* Subject to revision until all reports are received.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

Months	1936	1935	1934	Months	1936	1935	1934
January	61%	61%	....	July	69%	59%	....
February	67%	67%	....	August	75%	65%	....
March	68%	67%	....	September	76%	69%	62%
April	70%	61%	....	October	82%	76%	63%
May	68%	61%	....	November	79%	70%	56%
June	68%	65%	....	December	74%	60%	52%
Week ending Jan. 2, 1937	62%			Week ending Jan. 16, 1937	79%		
Week ending Jan. 9, 1937	77%			Week ending Jan. 23, 1937	82%		

New York Luncheon Club to Meet at Aldine Club

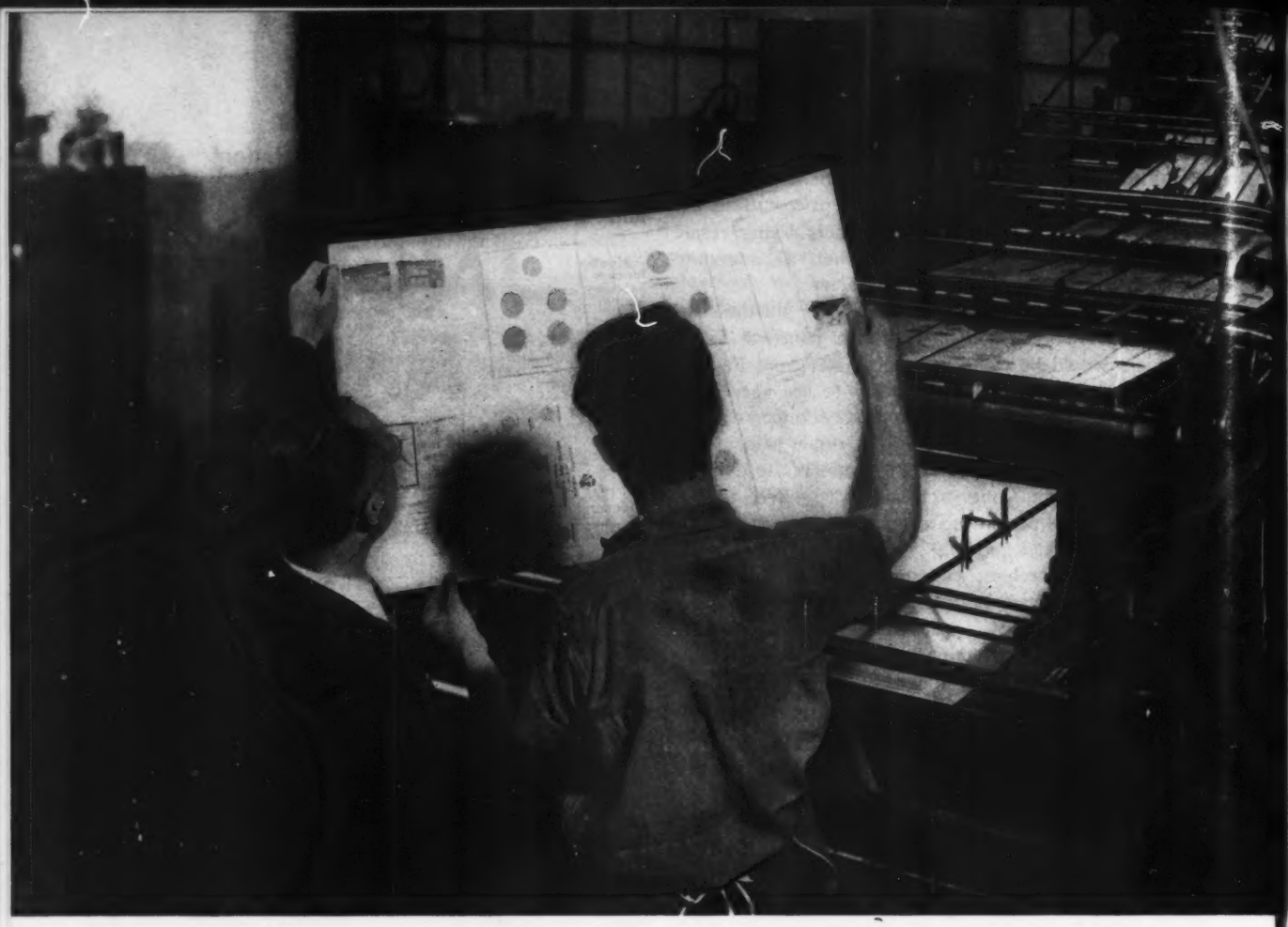
Through the courtesy and cooperation of E. J. Keller, the New York N.A.W.M.D. Luncheon Club has found it possible to make arrangements to hold its monthly luncheons at the Aldine Club, 200 Fifth avenue, New York.

This arrangement will make it possible for the club members to hold their luncheons not only within the atmosphere of a club but actually in a well appointed and well maintained club which the Aldine Club is.

One of the club's largest and most attractive private dining rooms has been set aside for the purpose of the association's luncheons. The half hour period from 12:30 to 1. as usual will be spent in the Club Lounge where members will gather and partake of refreshments preceding the actual serving of the luncheon. This half hour has come to be looked upon as a most opportune time to meet friends and make new contacts, while incidentally, a lot of business is also transacted.

The cost of the luncheon will be $1.50 per person including refreshments served from 12:30 to 1: as well as the luncheon served from 1: to 2:. No tickets will be sold in advance but reservations must be made by those desiring to attend. Reservations should be made by letter, wire or telephone (Telephone BRyant 9-1318) to Association Headquarters, 1109 Times Building, New York.

The new and attractive meeting place means a large attendance.



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ZINC SULPHIDE PIGMENTS IN PAPER

Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

The Fractionation of Mechanical Pulps And Its Relation to Refining*

By Paul D. Bray[1], Robert A. Thompson[2], and Jiun Shyr[3].

Abstract

** From a study of the results obtained it is concluded (1) that for a definite type of pulp the Appleton selective screen will fractionate the pulp reasonably accurately and therefore valuable as a control test in pulp manufacture; (2) that fine screen rejections should be refined and used thus saving good pulp wood; (3) that the use of the Appleton selective screen as a control test of refining is of value.*

During the past year, several types of mechanical pulps have been classified with the Appleton selective screen in an attempt to determine the degree of their refining. The problem of classifying pulp with the apparatus used concerns the pulp manufacturer as it may be advantageous to install this equipment for a continuous check on the correct amount of refining for high quality pulps.

The pulps used in the investigation came from commercial plants and were tested under the direction of the Department of Pulp and Paper Technology at the University of Maine. We wish to make grateful acknowledgement to the Committee on Educational Cooperation for the financial assistance given by them to this research program.

This report, made up from the results of several months' work, was written in an attempt to answer the following questions in regard to pulp classification using the Appleton selective screen:

1. Will the screen classify the pulp accurately?
2. Will this machine show how much refining should be done to give a required quality of pulp?
3. Will this screen also show over-refining and consequently a waste of power and pulp?

If this machine answers the given questions, then any pulp manufacturer should realize that such a classifier would be beneficial to own and operate in the laboratories of the pulp mill.

Equipment Used in the Investigation

For the tests conducted, the following equipment was used: 1. Appleton selective screen with stock supply tank, 2. Williams pulp testing apparatus, and 3. Physical testing equipment.

The Appleton selective screen is a diaphragm, four plate, flat screen, consisting of four compartments arranged in series so that a stream of dilute pulp flows through the four compartments consecutively. The capacity of each department is about 15 liters each, except that the capacity of the first compartment, that being about 10 liters only. Each compartment is provided with a screen plate (6.75 in. x 10.7 in.) of the desired size of opening. (At the suggestion of M. P. Chaplin, chairman of TAPPI, Mechanical Pulping Committee, the combination of four screen plates were covered with 24, 50, 90 and 200-mesh screen wire respectively, and were used in all of the tests made in this investigation). The screen is operated by a 1/2 h.p. motor, which drives the eccentric shaft at a speed of 375 r.p.m. under full load. Water sprays are used for agitation of the stock using a pressure of from 60 to 65 pounds per square inch. Adjustable cams were used to secure the correct head of stock on the plates to facilitate proper screening.

Types of Mechanical Pulps Used

The mechanical pulps used were received in the form of laps, hydraulic pressed sheets and slush pulps. They were of the following types:

Type of Pulp		Label
No. 1.	Stock accepted by fine screens	AC
No. 2.	Fine screen rejects before refining	BR
No. 3.	Fine screen rejects after refining	AR
No. 4.	Composite pulp (AC + AR)	C
No. 5.	Pulp from grinders after passing through knotter screen	

The following table gives the information furnished by the producers in regard to the refiners used and the size of screen openings of their fine screens:

Manufacturer	Refiner	Size of Fine Screen Opening
A	Voith	Not furnished
B	Bauer Bros.	.060 inch
C	No Refiner Used	.065 inch
D	Haug	.065 inch
E	Haug	.075 inch
F	Haug	{.090 inch {.055 inch
G	No Refiner Used	{.065 inch {.055 inch

Procedure Used for Testing a Sample of Pulp with the Appleton Selective Screen

The equivalent of a 50 gram oven-dry sample of the pulp was diluted with water in a pail to about 1 per cent consistency, and disintegrated with the Williams stock

* To be presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 22-25, 1937.

[1] Member TAPPI, Professor of Pulp and Paper Technology, University of Maine, Orono, Maine.

[2] Student, Department of Pulp and Paper Technology, University of Maine.

[3] Graduate Student, University of Maine.

breaker. (The time of disintegration varied with the type of pulp). The stock was then diluted with water in the screen supply tank to 0.1 per cent consistency and the agitator started. The screen was then started and the stock run to it. The time of draining of the supply tank was about 5 minutes. The time of screening varied with the type of pulp tested and the average was about 20 minutes. Fractionation was considered complete when the effluent passing over the first dam to the second compartment was clear. At this point, the screen was stopped and the pulp retained on each screen plate was made into a hand-sheet with the Williams pulp testing apparatus. A special 200-mesh wire screen was used in the sheet mould for the finest fraction, but in most cases it gave unsatisfactory results due to trouble in removing the sheet from the screen.

The finished sheets, after drying, were weighed and the per cent retained on each screen was thus determined. The weight and per cent of the pulp passing through the 200-mesh screen was determined by difference.

The physical tests made on the hand-sheets were:

1. Weights (25x40 inches—500), 2. Thickness tests, 3. Bursting strength tests (Mullen) and 4. Tear tests (Elmendorf).

From the physical tests made, the bursting strength factors (B.S.F.) and the tearing strength factors (T.S.F.) were calculated from the following equations:

$$\text{B.S.F.} = \frac{\text{Ave. bursting strength} \times 100}{\text{Wt. (25" x 40"—500)}}$$

$$\text{T.S.F.} = \frac{\text{Ave. tear} \times 100}{\text{Wt. (25" x 40"—500)}}$$

For each type of pulp tested, the averages were taken for ten samples whenever possible.

Accuracy of the Tests

From the tests made, it was found that for the first fraction (24 mesh), the per cent retained on the plate varied by about 2 per cent and for the other fractions, the retention varied by about 1 per cent. Such accuracy may be considered sufficient in commercial control analysis because of the several factors which influence the uniformity of pulp grinding and refining.

Tables of Results

The following tables give the results of the tests made with the Appleton selective screen. Table I gives the summary of the fractionation data; Table II is the summary of the Physical Tests of the fraction sheets; Table III is the summary of the tests made on standard hand-sheets composed of the original pulps as received before classifying.

TABLE I—SUMMARY OF FRACTIONATION DATA

Sample Labels	Retained on 24 mesh per cent	Retained on 50 mesh per cent	Retained on 90 mesh per cent	Retained on 200 mesh per cent	Passing 200 mesh per cent
A—(a)—4 *	37.80	22.08	10.48	1.82	27.82
A—(b)—4	30.00	19.60	10.12	2.40	37.88
A—(b)—2	62.26	14.30	6.72	2.02	14.70
A—(b)—3	34.08	16.28	8.72	2.32	38.60
B—2	77.82	16.24	4.20	0.72	1.02
B—3	74.42	12.96	3.68	0.56	8.38
B—1	16.92	22.92	11.56	0.90	47.70
C—1	10.58	21.76	11.98	3.90	54.78
D—4	16.06	20.28	10.42	1.14	52.10
D—2	66.88	11.34	4.54	0.44	16.80
D—3	0.00	2.96	13.96	7.56	75.52
E—2	63.90	13.44	4.84	0.92	16.90
E—1	32.54	43.36	14.46	1.12	8.52
E—3	1.38	23.03	30.50	2.24	42.58
F—2	73.49	5.64	2.18	0.28	17.96
F—1	19.72	28.94	13.56	1.16	36.62
F—3	0.34	5.94	17.36	1.96	74.40
G—2	30.52	17.36	8.08	1.04	43.00
G—5	14.60	18.50	9.26	1.16	56.48

* In labeling the samples, the following system was used: "A," "B," etc., represents the manufacturer. (a) and (b) were two different shipments of pulp from "A." "4" (or 1, 2, 3, 5, etc.) represents the type of pulp (or No. 1 = AC).

TABLE II—SUMMARY OF PHYSICAL PROPERTIES OF FRACTION SHEETS

Fraction No. 1: Retained on 24-mesh
2: Retained on 50-mesh
3: Retained on 90-mesh
4: Retained on 200-mesh

Sample Labels (A)	Fractions (B)	Freeness (seconds) (C)	Weight (grams) (D)	Thickness (inches) (E)	Bursting Strength Factor (F)
A—(a)—4	1	6.0	18.90	.0896	4.92
	2	9.4	11.04	.0435	6.47
	3	14.0	5.24	.0206	7.77
	4	42.5	0.91	.0046	8.78
A—(b)—4	1	6.2	15.00	.0660	6.05
	2	11.0	9.80	.0341	9.09
	3	24.5	5.06	.0175	11.37
	4	44.0	1.20	.0034	15.59
A—(b)—2	1	4.8	31.13	.1950	6.05
	2	7.0	7.15	.0304	9.09
	3	11.0	3.36	.0133	11.37
	4	16.6	1.01	.0077	15.59
A—(b)—3	1	5.0	17.04	.0936	2.30
	2	8.5	8.14	.0290	6.80
	3	13.0	4.36	.0131	8.53
	4	27.5	1.16	.0080	2.33
B—2	1	6.0	38.91	.1733	3.45
	2	7.2	8.12	.0264	9.87
	3	15.5	2.10	.0064	13.30
	4	15.5	0.36	.0020	7.46
B—3	1	6.2	37.21	.1615	10.42
	2	9.3	6.48	.0217	17.28
	3	22.5	1.84	.0058	20.94
	4	31.0	0.28	.0018	11.43
B—1	1	7.7	8.46	.0336	7.91
	2	13.0	11.46	.0373	13.36
	3	30.6	5.78	.0164	17.22
	4	65.2	0.45	.0023	19.15
C—1	1	6.2	5.29	.0240	6.58
	2	9.3	10.88	.0390	8.53
	3	13.3	5.99	.0198	10.05
	4	24.0	1.95	.0033	4.18
D—4	1	6.3	8.03	.0374	8.02
	2	9.0	10.14	.0391	10.76
	3	12.7	5.21	.0189	12.01
	4	11.3	0.57	.0029	4.50
D—2	1	4.6	33.44	.1762	7.81
	2	9.0	5.67	.0223	12.83
	3	13.6	2.27	.0081	14.74
	4	14.3	0.22	.0011	....
D—3	1	...	....	....	....
	2	4.9	1.48	.0070	....
	3	6.7	6.69	.0287	2.39
	4	10.0	3.78	.0140	5.67
E—2	1	4.8	31.95	.1879	5.38
	2	8.2	6.72	.0278	19.07
	3	11.2	2.42	.0092	11.93
	4	15.3	0.46	.0037	5.20
E—1	1	6.5	16.27	.0759	7.00
	2	9.0	21.68	.0871	7.93
	3	19.0	7.23	.0245	12.02
	4	20.5	0.56	.0027	6.58
E—3	1	...	0.69	.0040	....
	2	6.2	11.51	.0554	2.04
	3	6.7	15.25	.0560	3.19
	4	8.0	1.13	.0046	1.89
F—2	1	4.2	36.97	.1817	*
	2	9.0	2.82	.0104	16.43
	3	27.0	1.09	.0037	18.78
	4	20.3	0.14	.0009	14.97
F—1	1	6.2	9.86	.0414	6.99
	2	8.7	14.47	.0527	8.90
	3	10.3	6.87	.0228	12.38
	4	12.0	0.58	.0029	7.73
F—3	1	...	0.17	....	....
	2	4.8	2.97	.0156	....
	3	5.7	8.68	.0338	2.31
	4	6.2	5.98	.0034	....
G—2	1	5.7	15.26	.0686	8.67
	2	10.2	8.68	.0311	13.35
	3	16.0	4.04	.0139	13.52
	4	11.8	0.52	.0023	9.38
G—5	1	6.0	8.30	.0334	8.89
	2	20.0	9.25	.0315	13.44
	3	31.2	4.63	.0145	18.02
	4	25.0	0.58	.0020	10.08

* The sheets were too heavy to be tested on our Mullen bursting tester.

PHYSICAL PROPERTIES OF ORIGINAL PULPS

Sample Labels	Freeness (seconds)	Bursting Strength Factor	Tearing Strength Factor
A—(a)—4	87	14.61	59.80
A—(b)—4	403	15.57	47.70
A—(b)—2	23.4	6.70	60.30
A—(b)—3	398	16.25	64.50
B—2	17.2	11.10	57.20
B—3	364	8.30	61.00
B—1	733	27.96	56.40
C—1	105	11.74	47.60
D—4	131	24.80	54.70
D—2	17	12.41	93.00
D—3	220	10.17	30.00
E—2	24.2	12.87	89.80
E—1	660	20.52	80.20
E—3	50	10.57	34.60
F—2	9	9.39	89.20
F—1	390	24.40	69.30
F—3	230	6.57	23.60
G—2	199	23.70	83.70
G—1	1260	32.45	60.70

The Evaluation of Starch Products Used in the Beater and Tub *

By J. P. Strasser[1]

Starch as a subject for discussion at a technical meeting is of more than ordinary interest at this time. In the past few years the paper industry has faced a depression market with severe competition. The mills had curtailed production, and the tonnage produced had dropped considerably. Nevertheless, in this period the tonnage of starch shipped to the paper mills increased. Bear in mind that the price of paper and starch through this period remained relative; and also that there were no outstanding improvements in quality or type of starches.

These are the contributing factors to this peculiar situation:

1. The starch industry, because of research and close cooperation with the paper industry, has learned quite a bit about the needs of the paper mill. This enabled the starch people to produce and sell their products more intelligently.

2. A need for improved quality or lower cost caused the mills to examine the merits of various starches produced, and in so doing, a great many found a material they could well afford to use.

3. The changed specifications of the consumers of paper have resulted in the creation of new tonnage.

4. New patents and improved processes created a new usefulness for starch.

The paper industry consumes starch base products as adhesives, tub sizing starches, calender, beater and coating starches. Some of these products are used interchangeably for one or more of the above purposes. The problem of determining the merits of a starch used as an adhesive for coating is relatively easy, as compared with the problem of ascertaining its value in the beater.

TAPPI Inquiry on Starch

Some time ago a questionnaire was sent out by the T. A. P. P. I. to a great number of mills. The questionnaire was very ably worded, but, unfortunately, the number of replies was comparatively few. The questions and replies were very interesting on the whole, and to the point. The material in this questionnaire makes an admirable framework for a discussion of starch in the beater. The data should be of timely interest.

Question No. 1 asked as to the grades of paper referred to by the respondents. I have classified the mills answering in six groups: 1. Board; 2. Tag, cover and bristol; 3. Sulphite bond; 4. Rag bond; 5. Kraft, and 6. Book.

Question No. 2 was: "Why do you use starch, and to what extent is your objective realized?" The board mills were almost unanimous that their use of starch was for finish. Some used it to improve scuffing, quality and mullen. One mill found that starch helped to hold out wax. The makers of tag, bristol and cover used starch for strength, stiffness, finish and formation. The mills making sulphite bond and rag bond reported an improved mullen, and, to a limited extent, some improvement in fold, finish, sizing, rattle, and fuzz control. The kraft group looked for size, rattle, finish and mullen. In one instance a kraft mill reported grease resistance. The book mills used starch for mullen and fuzz control.

Question No. 3 was as follows: "What type of starch is used? By type we refer to botanic origin, and to physical properties to such extent as influenced by method of manufacture of subsequent chemical treatment or processing, e.g.: Is the starch you use a root or stem or seed starch (potato, sago, arrowroot, tapioca, canna, corn, wheat or rice); and is it of high or low specific viscosity; raw, treated, precooked, chlorinated, oxidized, partially dextrinized, or esterfied, or a combination of the above?"

Most of the companies reported that they used untreated tapioca or corn starch. They were divided approximately equally in their usage of these materials. The oxidized starch predominated where a modified starch was used.

Question No. 4 was: "Since the above types of starches are even more widely differentiated in physical and chemical properties than the various types of cellulose paper stock and pulps, for what technical reasons have you selected your particular type?"

This question brings up some interesting points. On the whole, the paper mills are using two basic materials, corn starch and tapioca flour. These materials are used either untreated or modified in several ways to a more or less degree. The reason given by the board mills for their selection was price. Most of the other mills put facility of handling and results on an equal basis with cost.

Question No. 5 asked: "Discuss from theoretical and practical angles your interpretation of the manner in which your starch functions in connection with cellulose to achieve your object, and indicate why you consider it better adapted to this purpose than other types."

Survey of the answers to this question reveals that the theory of most is that the starch colloid functions as an adhesive. Its collodial properties replace hydration. It allows the paper maker much more leeway in developing or retaining some characteristics in his sheet which he would lose should he treat the stock mechanically.

The next question (No. 6) was in regard to the form of adding starch to the beater, and at what period in the beating and sequence.

Examination of the replies showed that 80 per cent used cooked or semicooked starch. There was no apparent agreement as to when it was advisable to add it, or in what sequence in relation to the fiber, filler, etc.

Question No. 7 was: "What has been your experience relative to the absorption capacity of cellulose for starch; and how is this variant in respect to different types of starch? On the same basis, what has been your experience in regard to retention capacity of fibers and sheet of paper; and how does type of starch affect this? What analytical method of separation of starch from cellulose did you employ in arriving at these conclusions? If your method contains any feature making this separation a shorter or more positive operation than those usually employed, discuss this feature in more or less detail."

We will not attempt to analyze the answers to this ques-

* To be presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 22-25, 1937.

[1] Stein, Hall Mfg. Company, Chicago, Ill.

tion. However, we might point out this: the Institute of Paper Chemistry engaged on a research project of starch in paper. Some years of steady work has not put them or us in a position where we could answer this question satisfactorily, with facts to back us up. From the work done at the Institute, we have come to the conclusion that there is no absorption. The retention question is not answered because no method has been developed which has met with complete acceptance.

Going back for a moment to Question No. 4, it is worth a moment's thought. We will repeat the question: "Since the above types of starch are even more widely differentiated in physical and chemical properties than the various types of cellulose paper stock and pulps, for what technical reasons have you selected your particular type?"

Comparing the different properties of the starch and the various fibers available for paper, we know of no case where there is a difference as marked in starches used in the beater as exists between ground wood and linen fibers. However, there is no question that the differences are partly responsible for the varied starches used in the beater room. The three factors governing the adoption of any particular type are: the results obtained, facility of handling and cost.

The properties of starch which are useful are developed in the presence of water, using heat or chemicals, such as alkalis, as means of hydration. In obtaining hydration colloidal properties are developed. For some paper mill needs these colloidal properties are incidental, and to only a limited extent are responsible for the changes which occur when starch is added to a furnish. In most cases the usefulness of starch is evaluated in a finished sheet of paper, where the starch is no longer present in colloidal form. The mills which add dry starch to the beater depend upon heat during the drying operation to develop the usefulness of the starch. It is possible that the reason a great number of mills report this procedure of no value is because by the time sufficient heat has been developed in the sheet to gelatinize starch, there is not sufficient water present to achieve these results.

One member replying to Question No. 4 on the type of starch used, and why, says: "The blank starch is not only convenient, but economical; and the effect of cooking starch removes some of its value" We believe that the member who wrote this did not intend a literal interpretation of his answer. What has happened is that this mill is getting better results using this type of starch dry. On the hole, the retention of dry starch is slightly better than of cooked starch. In theory, because we think of cooked starch as an adhesive, you would think the reverse would be true. But bear in mind that starch does not develop its adhesive qualities until water is removed. The reason is that the starch granule swollen, while larger than the uncooked granule, is capable of far greater distortion. It would have a tendency to leave the sheet easier. We have found that the slower the furnish the less difference in retention of dry and cooked starch. So, by producing a starch with a particle size large enough to make it retain more easily, and yet small enough to get good distribution, you will get better retentions with a dry starch than with a cooked starch, in a free furnish in the lighter weights. There is no question that the reporting member knew exactly the facts on which he was drawing his conclusions, yet worded them in such a way as to lead to possible misinterpretation.

Another answer in regard to the manner in which starch functions with cellulose was stated as follows: "Starch is an adhesive, and it is in the furnish as a jell. When the starch dries the fibers are cemented together. Starch also being a jell, completely surrounds the fibers, clay or rosin particles, and gives better retention."

This brings up a very debatable point. There is no question about the adhesive value of starch. There is a question that the retention of filler in the presence of starch is better. Starch works better with size and alum present. Size is more efficient in the presence of starch. Its function with filler, as far as we can determine, is to add strength, so that a high ash can be carried safely. We are dependent upon the bonding of filler in heavily loaded sheets to control dusting. We have found that it gives us some control of the strike-through factor in the high speed printing operation. In a closed system starch does not increase retention. In an open system, because of better and closer formation, starch would tend to help retention.

In an article published last year by W. R. Willetts on the effect of retention of pigment in the presence of starch, (2) one of his tables indicates that the addition of starch hurts retention rather than helps it. However, in checking all of his tables, you will note that the same procedure and controls are used throughout. The sheet shown as the blank without starch in the starch table, has higher retention than any other sheet in any of his tables. If we eliminate this one sheet and then compare his starch table with his other tables, it will not prove that starch has improved retention; but it certainly will prove that it has not hurt it. The hand sheets with starch average better retention than some of the sheets which are being used as examples in which manipulation has been used to increase retention.

Another reply to this question was as follows: "We believe that starch has somewhat the same effect as that produced by hydration. In this respect, it is meant that it takes the place of mucilage formed by prolonged hydration, as when beating cellulose."

When starch is cooked the water which carries it is the water of hydration, and not water of consistency. There is no question that the addition of a starch jell changes the freeness of the furnish. We believe that it is this factor of carrying the water just a shade further down the wire which is responsible to some extent for improved formation. The fact that retention may be somewhat lower is off-set by this factor of formation.

This brings up another angle. Retention in itself is not a major factor. There are many ways of loading paper with fillers cheaper than starch. We have produced some starches which we are reasonably sure approximate 100 per cent retention; yet the results obtained were not as good as the starch, of which only 30 to 35 per cent was retained, simply because the factor of distribution entered into the case. Using the same amount of the two starches, the one with the lower retention had almost perfect distribution, and so affected the furnish uniformly. The high retention starch was distributed so poorly that there was a distinct disadvantage in quality.

A Retention Estimating Procedure

A retention method which seems to have considerable merit has been developed by T. A. Pascoe, technical director of Nekoosa-Edwards Paper Company, and his assistants, H. E. Nelson and C. A. Lightfoot. Their views in this connection are presented in the following:

"The revised official standard method T 420m for the quantitative determination of starch in paper offers two alternative methods of determining the reducing sugars obtained by acid hydrolysis of the extracted starch. The first involving the use of Fehling's solution requires considerable time and manipulative skill to obtain concordant results. It is also subject to the difficulties and irregularities inherent in copper reduction methods which employ strongly alkaline solutions, due to slight variations in time

and temperature at which such reductions are carried out. There is also the danger of reoxidation of the cuprous oxide during the filtering and washing procedures.

"The use of Benedict's solution as specified in the official method presents two practical difficulties. The first is the serious danger of spattering, and loss of material as the result of concentration of the dissolved materials in keeping the volume down to the recommended 25 cc. during titration. The second difficulty is the obscure end point of the titration.

"Recent adaptations of Hagedorn-Jensen (*2*) Micro method for the estimation of blood sugar to the determination of the products of the malt digestion of starch (*3*), (*4*) and to the determination of the diastastic activity of wheat flour (*5*) suggested that this method might have certain practical advantages over the official methods for the determination of starch in paper.

"Because of the small quantities of starch to be extracted from a reasonable size of paper sample, more dilute reagents were indicated than had been used in studies on malt or the saccharogenic activity of wheat flour.

"For use as a practical method it did not seem worth while to evaluate the results in terms of any particular reducing sugar, but rather to standardize the solutions using the various starches in use in the mill. This course avoids the choice of a factor for converting reducing sugars to starch. The literature is not in agreement on the matter of such conversion factors.

"Because the extracted starch hydrolysate would be more acid than the enzyme hydrolysates to which the method had been adapted, exploratory work was carried out to outline the optimum conditions for preparing the hydrolyzed starch solution for the alkaline reduction step in the procedure.

"The fact that the hydrolyzed starch solution was considerably more dilute than the solutions used in the previous adaptations of the ferricyanide method, minor changes were made to reduce the amounts of alkaline ferricyanide, and acetic acid reagent recommended by Gore and Steele.

"A detailed study varying the time of heating the starch hydrolysate—alkaline ferricyanide solutions for the reduction step showed that constant maximum values were not obtained for reduction times of less than 30 minutes.

"A standard time of forty minutes was chosen in contrast to the 15 minute period recommended by Gore and Steele.

"Finally the starch extraction step of the present T. A. P. P. I. method was studied with respect to the time for refluxing the paper sample with dilute acetic acid and the amount of hot water wash used to remove the last traces of starch from the extracted paper on the Büchner funnel. The 1½ hour extraction period proved adequate although a period of two hours was shown to be permissible. The recommended quantity of hot water wash, 50 cc., was likewise found sufficient for most of the papers examined.

"In order to provide a fiber free starch for hydrolysis refiltering of the filtrate from the filtration on the Büchner funnel through a coarse Jena fritted glass crucible proved very convenient. This has the added advantage that only a very small amount of hot water is necessary to wash this type of filter as compared with a funnel and filter paper.

"The complete revised method follows:

REAGENTS:

0.05 N Alkaline Ferricyanide Solution:
16.5 g. pure $K_3Fe(CN)_6$
22.0 g. Na_2CO_3
Distilled water to make one liter.

0.05 N Sodium Thiosulphate, $Na_2S_2O_3$:
12.41 g. $Na_2S_2O_3$ per 1000 cc. water
This solution is standardized against 0.05 N $K_2Cr_2O_7$.

Acetic Acid Reagent:
200 cc. glacial acetic acid
20 g. Zn. $SO_4 \cdot 7H_2O$
70 g. KCl
Distilled water to make 1000 cc.

Potassium iodide crystals.
Starch indicator solution 2 per cent.
Standard hydrolyzed starch solution.
Preferably the same starch that is on or in the paper.
One gram of the starch hydrolyzed with 15 cc. conc. HCl, neutralized with Na_2CO_3 and made up to 1000 cc.

PROCEDURE:

Cut five or ten grams of the paper into small strips, fold and pleat. Place under a reflux condenser with 5 cc. glacial acetic acid and 150 cc. distilled water. Reflux for two hours. Filter on a Büchner funnel, refilter filtrate through filter so as to remove paper fines. Wash filter pad thoroughly with hot distilled water.

Add 15 cc. conc. HCl to filtrate and reflux for 45 minutes. Neutralize with 15 g. solid Na_2CO_3 and make up to 500 cc. or one liter.

Pipette 25.0 cc. of this solution into a 500 cc. Erlenmeyer flask containing 25.0 cc. of 0.05 N alkaline $K_3Fe(CN)_6$. Place in a boiling water bath for exactly 40 minutes, keeping the bath level above the level in the flask. Remove, add 150 cc. cold distilled water, 5 small crystals of KI, 70 cc. acetic acid reagent, and 2 cc. starch indicator solution. Titrate to absence of blue color, obtaining end point with single drop of 0.05 $N Na_2S_2O_3$.

CALCULATIONS:

Subtract the cc. of 0.05 N $Na_2S_2O_3$ used from the number of cc. of 0.05 N $K_3Fe(CN)$ used (25.0). This gives the number of cc. of the alkaline ferricyanide reduced by the glucose solution.

Equivalent of 1 cc. of 0.05 N $K_3Fe(CN)_6$ for some starches examined: Stein-Hall Royal tapioca, 0.0015 grams; Meinke Tufjel, 0.0012 grams, and Stein-Hall tub-size 52, 0.00115 grams."

The method of Pascoe, Nelson and Lightfoot for the quantitative determination of starch in paper represents a definite contribution to the subject. It differs from the "Revised standard method T 420 m" in the method used to determine the reducing sugars, i.e.: instead of using Fehling's solution or Benedict's solution, it uses an alkaline ferricyanide solution. Instead of the filtering, washing and redissolving operation before titration, (as in the official Fehling method) the titration is carried out in the original flask. While the reduction operation is timed to 40 minutes, on a boiling water bath, the operator is free to do other work during the interval. It does not require the skill that is necessary when using Benedict's solution.

Difficulty has been encountered in thoroughly removing the starch from certain hard-resin-sized papers by boiling with dilute acetic acid as directed in the official method. Tests made with iodine after extraction showed that the starch had not been removed completely. Experiments are being made to try to overcome this difficulty, either by first extracting the rosin with hot alcohol, or by some other method.

Work at Institute of Paper Chemistry

Analyzing the recent work, I think that the work at the Institute has brought out a basic fact: The starches now being generally used by the paper industry in the beaters are not adsorbed on the fiber. We believe, not that they completely surround each and every fiber, but that the retention is wholly mechanical. The flow of stock on the wire forms a web and retains the starch just as the web retains any other filler. In light weight sheets and open sheets it has been usually impossible to hold sufficient starch to obtain results that are in line with the cost. We have found another interesting thing. The improvement due to the use of most starches is much more marked in the presence of size, alum and fillers than it is in a furnish that contains none of these materials. Notwithstanding this fact, we have found it possible to produce a starch which, in the absence of fillers, functions remarkably well.

Another point of interest in the work that has been done at the Institute is that the marginal utility of starches was generally reached in the 1½ to 4 per cent ranges, depending on the furnish, taking into consideration the change of physical properties of a sheet caused by the use of starch; and taking into consideration the amount of starch used and its cost. In most furnishes we reach a

TABLE I—LABORATORY HAND SHEETS

News Print Furnish—1

Materials ..... 70 per cent news print groundwood and 30 per cent news print sulphite; 1½ per cent alum; 0.5 per cent rosin.
Treatment ..... Stock circulated in the beater without hydrating until mixture becomes homogeneous.

News Print Furnish—2

Materials ..... Same as in N.P. 1, except that 4 per cent cooked starch was used.
Treatment ..... Same as in N.P. 1, except that starch was added and precipitated in the pulp.

Sample No.	Ream Weight	Mullen	Double Fold	Breaking Weight	Elongation Per cent	Breaking Length	Tear	Porosity	Ink Abs.	Carson Curl	Valley Size
N.P. 1	32.6	23.00	2.0	4.27	.66	5545	44	7.24	9.4	3.40	1.1
N.P. 2	31.7	26.55	2.0	4.70	.49	6160	26	8.40	8.6	1.84	1.6

point beyond which the increased use of starch is either uneconomical or inefficient.

In using cooked starch there is no question that the heavier the consistency, the more efficient are the results obtained from the starch. Bear in mind, however, that this increased efficiency, when measured by facility of handling some other factors, is not of such marked importance that we can state definitely that the only way to use a cooked starch is to get it to the point where it is heavy enough to be handled with a shovel.

Some of the Institute reports are of particular interest. In comparing runs on tapioca with corn, using the same amounts of each, both prepared in the same way, a report states: "Tapioca shows better mullen, folding endurance and ink resistance; but corn is better in porosity and retention." This run was made without resin and alum. Making the same tests with resin and alum showed considerable improvement with both starches. This report states: "Tapioca is much better in mullen and in double fold; but corn is better in retention." This particular method of determining retention has been discontinued.

One report states that these runs show one significant fact, namely; that the difference between corn starch and tapioca flour, insofar as their sizing characteristics are concerned, does not appear until the granule actually has been ruptured. Consequently, the inherent characteristic of the two lies within this granule. This is a point which general experience would confirm, but the data reported herein definitely proves its validity.

There seems to be but very few real facts that are known about starches used in the beater. Analysis of literature of the past forty years on this subject, the answers to this questionnaire, and analysis of mill usage definitely point out one fact: The wide range of papers, the varied furnishes, and the manipulations of these furnishes to obtain specific qualities, present differences which provide little if any common factors. There is no best starch for the beater because we have no standard which covers the field.

We present some of the tables giving some of the data obtained in the course of the research on beater starches.

Referring to Table I, a gain of mullen was obtained at the expense of tear. The conclusions on this experiment would depend on who analyzes the table.

Examining Table II, at first glance you would conclude that starch "A" which is run No. 2 would solve a lot of the troubles of the kraft paper industry. However, tests over a period in actual mill operations do not check with the laboratory tests. The reasons are due to the fact that few, if any, of the conditions represented in the laboratory could be duplicated in operation. In the kraft mill, where these tests were conducted, it was actually found that none of these starches tested could be used to advantage, primarily because any increase in test was entirely out of proportion to cost.

Table III may be of interest for several reasons: 1. It represents special treatment of the starch in an endeavor to obtain improved results. 2. It is a comparison of two totally different starches, specially treated, combined in a furnish with and without filler. 3. Also, there was an attempt made to evaluate beta-amylose and alpha. It was impossible to disperse alpha-amylose, either by boiling in water or alkali, and no beater runs could be made with it.

TABLE II—COMPARATIVE RUNS ON STARCH "A," "B," "C," AND "D," USING KRAFT PULP

RUN NO. 1. Blank

Furnish: 450 grams oven-dry kraft (1370 grams wet)
24 liters water (1.87 per cent consistency)
1 per cent rosin size
2 per cent alum
16½ pounds on bed plate
Time of beating ..... 25 minutes
Mullen at end of beating ..... 102 per cent
Freeness at end of beating ..... 850 per cent
Stock slushed at end of beating, and size and alum added in order.

RUN NO. 2. "A"

Furnish: Same as for Run No. 1, except that 4 per cent "A" was added after the size and alum.
Cooked 1:10, then diluted to 1:20.
Mullen at end of beating ..... 98.7 per cent
Freeness at end of beating ..... 863 per cent

RUN NO. 3. "B"

Furnish: Same as for Run No. 2, except that "B" was substituted for "A."
Mullen at end of beating ..... 91.2 per cent
Freeness at end of beating ..... 850 per cent

RUN NO. 4. "C"

Furnish: Same as for Run No. 2, except that "C" was substituted for "A."
Mullen at end of beating ..... 92.4 per cent
Freeness at end of beating ..... 860 per cent

DATA

Run No.	Weight of Sheet	Ream Weight	Pop	Mullen	Tear	Porosity (Gurley)	Ink Abs.	Valley Size	Freeness
1	.934	34.4	27.0	76.6	99.0	1.55	8.76	120.5	850
2	.944	34.1	36.9	105.0	83.5	1.30	7.40	125.3	865
3	.910	33.6	31.0	90.4	83.0	1.40	9.90	94.0	850
4	.930	34.0	34.8	98.25	85.5	1.30	10.00	48.9	860

TABLE III—LABORATORY HAND SHEETS

DATA:

RUN P 10

Materials .... 50-50 soda-sulphite; 1.5 per cent alum; 4 per cent "A."
Treatment .... Beaten for 85 minutes with 10 pounds. Starch cooked 1:10 at 87 deg. C., and the required amount of alkali added to the starch before addition to the beater furnish.

RUN P 4x..... Materials and treatment the same as in Run P 10, except that "B" was used instead of "A."

RUN P 11..... Materials and treatment the same as in Run P 10, except that 40 per cent of clay was added with the starch.

RUN P 3..... Materials and treatment the same as in Run P 11, except that "B" was used instead of "A."

RUN BETA..... Materials and treatment the same as in Run P 10, except that beta-amylose from corn starch was used, and in this case no cooking was required.

Run No.	Ream Weight	Mullen	Breaking Weight	Elongation, Per cent	Breaking Length, Yards	Double Fold	Tear	Gloss	Thickness	Porosity Gurley	Ink Abs.	Retention	Ash
P 10	41.5	83.50	11.70	1.03	5540	153	52	18.0	.0060	24.5	36.8	23.00	....
P 4x	42.0	82.10	10.85	1.35	6450	122	40	18.0	.0066	13.8	16.8	11.70	....
P 11	41.5	50.30	8.10	.75	3850	20	47	20.1	.0058	16.3	15.8	31.50	9.20
P 3	42.0	55.00	8.30	.89	3900	13	46	22.4	.0050	12.6	20.0	17.50	11.48
Beta	42.5	64.25	9.40	1.06	4320	59	61	20.1	.0060	17.8	17.1	6.84	....

TABLE IV

	Experimental Paper Starch in Beaters	Regular
Actual weight	15.0	15.8
Bulk	3.1	3.1
Mullen (corrected to basis weight)	33	30
Breaking length, meters	7090	6960
Tear, in grams	28	34
Fold (average)	227	164
Opacity (per cent)	79.6	83.8
Sizing	Good	Good
Penetration	17	29
Erasure	Good Tub Sized	Fair-good Tub Sized

Some alteration of structure must have occurred during the preparation of the beta-amylose because of its low retention. In theory, in the unaltered starches, the beta-amylose must be more active than is indicated by the isolated material.

At first glance, Table IV seems to have a lot in common with Table I. The difference is that Table IV represents results in the mill use of starch to advantage. Table I created no favorable comment.

Research Data on Tub Sizing

In the course of research on tub sizing, we are submitting in part some of the information on work being done at the Institute of Paper Chemistry which is part of a program and subject to further investigation.

SUBJECT: *Evaluation of Starches for Tub Sizing Purposes.*

Objectives of the Investigation:

(1) To develop a satisfactory laboratory procedure for critically evaluating tub sizing starches.

(2) To evaluate, through such procedure, experimental starches as they may be submitted by Stein-Hall Manufacturing Company.

Whereas, formerly a beater-sized paper was used, the present work was conducted with a 20 pound slack-sized, 100 per cent rag sheet. The starches were prepared for use by the recommended procedure. This apparatus consists essentially of a laboratory size press, permitting the tub sizing of standard bond paper with starch under conditions approaching those of commercial operation, including controlled pressure between the rolls, uniform speed and constant temperature.

Samples of the surface-sized paper thus prepared were carefully conditioned at constant temperature and humidity before testing. In addition to those sheet characteristics which were evaluated in the former work (namely: basis weight, mullen, caliper and apparent density, fold porosity, smoothness, tensile strength, stretch, tear, Valley and TAPPI size, castor oil penetration and brightness) supplementary tests (pick, erasure, turpentine flotation, K & N ink smear, and pen and ink tests, using both glycerine ink and one equivalent to the Bureau of Standards product) were made in the present work. On the basis of these tests the relative merits of the respective starches were evaluated as indicated in the table of data.

Under the conditions employed it is apparent from the data that, for tub sizing purposes, starches "A" and "B" are definitely superior to starches "C" and "D". Inspection of data will make the magnitude of differences apparent.

The fact that the starches studied have been accorded the same ranking in the two series of investigations gives evidence that the procedures developed for the purpose may be relied upon to afford a sufficiently precise method of yielding reproducible and definite results by which the relative characteristics of starch in relation to surface sizing properties may be evaluated.

PAPER USED:

Eleven rolls of six inch paper, 20 pound ream size, 100 per cent rag, slack-sized and showing a definite tendency to feather to ink tests, were received. This paper showed an oven-dry content of 95.09 per cent pulp. Previous to its use, a roll of this paper was kept in constant temperature and humidity room for 24 hours. This precaution (i.e. conditioning the paper) had little effect, except to insure that the temperature of the paper as it entered the size bath was the same throughout various runs.

The paper used, being slack-sized and of rather low basic weight, gave the effect of exhibiting a very low wet strength. This condition resulted in some experimental difficulty since it was quite impossible to make adjustments during the run without breaking the sheet, thus necessitating a condition of perfect alignment before attempting to pass the sheet through the bath.

METHOD OF DRYING:

Several slight changes with reference to previous work were made in the method of drying the surface-sized paper. The reeled paper, after surface sizing and pressing, was unwound from the reel and strung between parallel wires in a constant temperature and humidity room. The only tension on the paper during drying was that due to the paper's own weight and was not enough to prevent shrinkage in either direction. By this procedure results were made more comparable by eliminating possible up-setting influences due to the effect which normally occurring changes in atmospheric temperature and humidity might have on the rate of drying and the strength characteristics of the sheet.

ANALYSIS OF THE DATA:

In the accompanying data, Table V represents that derived from the first run, and Table VI, that from a check run. The results of the pertinent tests obtained for the two runs agreed remarkably well. The differences shown were probably due as much to variations in the paper itself as to variations in application of the starches, or to the selection of a proper sample for testing. Certain aspects of the data will be discussed in the order in which they are tabulated.

Basis Weight

The basis weight figures for the surface-sized sheets are important only for the purpose of calculating strength factors. Strength tests were made only on those sheets which were weighed. (See Tables V and VI). The data do not show exactly how much of the increase in basis weight accompanying the sizing operation was due, respectively, to the shrinkage of the sheet on drying and to the incorporation of starch. The untreated paper itself varied in basis weight in the machine direction. All twenty samples for the two runs were made from the same roll and were removed in the order numbered for each set, the first run being numbered with Arabic numerals, the second with Roman numerals. In all cases except one, the increase in basis weight over the average value for the untreated samples of each group is greater for the starch-treated samples than for the water-treated samples. Total averages over both groups of data result in a basis weight of 19.125 pounds (17x22/500 ream size) for the untreated paper, 19.695 pounds for the water-treated samples and 19.810 pounds for the starch-treated samples. This would indicate that a gain in weight of 0.57 pounds per ream of treated paper is caused by shrinkage on drying and that a gain of 0.115 pounds per ream is due to incorporation of starch. However, this involves the assumption that the extent of shrinkage is the same for the surface-sized paper as for the water-treated paper, which may or may not be the case, and probably is not. Moreover, considering that only two water-treated samples were taken, the probable error in the values found in that instance is high.

TABLE V—FIRST TUB SIZE RUN

	Sample No.1 Untreated Paper	Sample No. 2 Tub Sized Starch A	Sample No. 3 Untreated Paper	Sample No.4 Tub Sized Starch B	Sample No. 5 Untreated Paper	Sample No. 6 Tub Sized Starch C	Sample No. 7 Untreated Paper	Sample No. 8 Tub Sized Starch D	Sample No. 9 Untreated Paper	Sample No. 10 Water Treated	Average 1,3,5,7,9
Basis weight 17x22—500 ream size	19.19	19.78	19.08	19.99	19.30	19.90	19.25	19.93	18.98	19.83	19.16
Basis weight per cent increase from average untreated sample		3.24		4.33		3.86		4.02		3.50	
Mullen ratio	113.4	164	115.3	166.5	112.1	154	114.5	156.9	110.1	119.1	113.1
Mullen per cent increase from average untreated sample		45.00		47.21		36.16		38.73		5.31	
Mullen rank of treated samples		2		1		4		3			
Caliper—inches	.003235	.003770	.00326	.00376	.00333	.00378	.00324	.00374	.00320	.00380	.003253
Apparent density	5.93	5.25	5.85	5.35	5.80	5.27	5.95	5.33	5.93	5.23	5.89
Fold—in—MIT units	61.7	176.7	51.2	185.5	64.9	172.8	57.1	169.7	66.6	56.3	60.3
Fold—in per cent increase from average untreated sample		193.0		207.6		186.6		181.4		—6.63	
Fold—in—rank of treated samples		2		1		3		4			
Fold—across—MIT units	26.1	61.5	28.8	62.1	30.9	59.5	26.0	54.5	25.3	28.5	27.4
Fold—across—per cent increase from average untreated sample		124.5		126.6		117.2		98.91		4.01	
Fold—across—rank of treated samples		2		1		3		4			
Porosity—100 cc. air—Gurley densometer—seconds	140.8	123.8	139.3	120.3	137.1	113.2	137.8	113.1	136.5	96.1	138.3
Porosity—per cent increase from average untreated sample		—10.49		—13.02		—18.15		—18.22		—30.51	
Porosity—rank of treated samples		1		2		3		4			
Smoothness—Bekk—wire side—seconds	37.1	10.2	35.8	9.2	38.5	10.7	38.2	9.9	39.1	10.3	37.74
Smoothness—Bekk—felt side—seconds	30.4	8.3	30.1	7.9	27.5	8.1	30.3	7.9	29.3	7.0	29.5
Tensile factor—in	63.8	74.5	64.5	73.7	65.1	71.1	61.9	69.5	59.3	58.0	62.9
Tensile factor—in per cent increase from average untreated sample		18.44		17.17		13.04		10.49		—7.79	
Tensile factor—in—rank of treated samples		1		2		3		4			
Tensile factor—across	36.4	43.6	36.6	41.6	36.1	41.4	35.9	41.2	37.2	34.7	36.45
Tensile factor—across—per cent increase from average untreated sample		19.62		14.13		13.58		13.03		—4.80	
Tensile factor—across—rank of treated samples		1		2		3		4			
Stretch—in—per cent	2.37	4.1	2.23	3.9	2.3	3.53	2.15	3.40	2.00	3.18	2.21
Stretch—in—per cent increase from average untreated sample		85.53		76.47		59.73		53.85		43.89	
Stretch—across—per cent	5.17	7.75	4.82	6.78	5.30	6.78	5.13	7.00	5.42	6.95	5.17
Stretch—across—per cent increase from average untreated sample		49.90		31.14		31.14		35.40		34.43	
Tear factor—in	4.68	5.14	4.99	5.04	5.12	5.05	4.88	5.05	4.68	4.76	4.87
Tear factor per cent increase from average untreated sample		5.54		3.49		3.70		3.70		—2.26	
Tear factor—in—rank of treated samples		1		4		2–3		2–3			
Tear factor—across	4.81	4.99	4.70	4.79	4.79	4.92	4.78	4.86	4.71	4.50	4.76
Tear factor per cent increase from average untreated sample		4.83		.63		3.36		2.10		—5.46	
Tear factor—across—rank of treated samples		1		4		2		3			
Valley size—seconds	6.0	13.45	6.16	13.97	5.12	8.18	6.02	8.59	5.40	3.27	5.74
Valley size per cent increase from average untreated sample		134.3		143.4		42.51		49.65		—43.03	
Valley size rank of treated samples		2		1		4		3			
TAPPI size—seconds	30.5	37.4	29.1	36.1	27.5	32.4	27.5	35.2	30.3	22.5	28.96
TAPPI size per cent increase from average untreated sample		29.14		24.66		11.88		21.55		—22.31	
TAPPI size rank of treated samples		2		3		4		1			
Castor oil penetration—seconds	86.1	85.4	81.5	83.0	85.4	87.3	88.9	86.2	83.6	76.2	85.1
Castor oil penetration per cent increase from average untreated sample		+.35		—2.47		2.59		1.29		—10.46	
Castor oil penetration—rank		1		4		3		2			
Brightness	82.94	82.44	82.92	82.54	82.68	82.52	82.88	82.46	83.06	82.84	82.90
Brightness per cent increase from average untreated sample		—.555		—.434		—.458		—.531		—.072%	
Pick test (Dennison's standard waxes)	12	17½	12—	17½	12—	17½	12—	16½	12—	11½	12—
Pick test—rank of treated samples		1–2½		1–2½		1–2½		4			
Erasure	I	II	I	II	I+	II+	I+	II+	I+	I	I+
Erasure rank of treated samples		1–2		1–2		3–4		3–4			
Pen and ink test—Bureau of Standard's ink	I	II	I	II	I	II	I	II	I	I	I
Pen and ink test—rank of treated samples		1–2		1–2		3–4		3–4			
Brightness of K. & N. ink spot	45.61	45.84	43.69	47.56	43.69	45.44	45.64	45.46	45.91	44.93	44.91
Brightness per cent increase from average untreated sample		2.07		5.90		1.18		1.22		.04	
Brightness of ink spot—rank of treated samples		2		1		4		3			

* I = Poor. II = Fair. III = Good.

Further in view of the wide deviation in basis weight of the untreated samples, which is apparent from comparison of the odd numbered samples of both groups, it is obvious that this consideration applies in all cases. The 0.115 pounds of starch per ream is only 0.58 per cent of the total ream weight of the surface-sized paper. It would appear that this apparent figure must not represent the actual case, as it seems insufficient to account for the large increase in strength characteristics to be noted. An alternative conclusion to be drawn is that the surface-sized paper did not shrink on drying to the extent that the water-treated samples did. As in a previous work, no correlation is evidenced in the data between apparently greater increase in basis weight of the treated samples over that of the untreated samples and increased physical tests.

In evaluating the significance of the strength tests obtained with the tub-sized samples, it is necessary to compare them with those of the water-treated sheets (samples 10 and X), as well as with those of the untreated samples designated by odd numbers.

Mullen Factor

The increase in mullen factor exhibited by the surface-sized sheets over the untreated samples may be taken as a good indication of the adhesive qualities of the starches when applied to the surface of the sheet. A certain small portion of this increase, presumably approximating the magnitude of increase exhibited by the water-treated samples, is, of course, due to the rearrangement of fibers accompanying shrinkage.

The Mullen ration rates starches "A" and "B" to be far superior to "C" and "D" in adhesive properties. The percentage increases over the untreated samples were found to be much greater in the present work than those previously observed, because the original paper in the present instance was slack-sized.

thus magnifying the effects due to the starches. The relative results obtained were consistent throughout both runs, ranking the starches in the order of decending adhesive strength as B, A, D, C.

Apparent Density

The apparent density is defined as the ratio of basis weight to caliper and does not represent a significant feature in the case of such uncalendered sheets. This quantity decreased with respect to the untreated samples about the same amount in all cases of the treated sheets either by tub sizing or by water. This probably is due through wetting, to the release of tension within the sheet which has been imposed during the process of manufacture and which was not restored under the conditions of drying employed.

Folding Endurance

Again, in the cases of folding endurance, starch "B" is found to be the best of the four starches. It will be noted that the ranking found in the present work in respect to this property is not in accord with that previously reported. However, the increase in folding endurance was very large and quite similar in the case of all four starches and, since the test in itself is variable, it cannot be regarded as a precise measurement and is not to be relied upon to indicate differences of the magnitude here encountered.

Porosity

The porosity test may be regarded as an indication of the covering value or film producing value of the starches when applied to a sheet. The greater the porosity, i.e., the less time required for the passage of a given volume of air through the sheet under specified conditions, the less is the film development of the starch, other conditions being the same. The data shows that starch sizing of a slack beater-sized rag sheet by the method employed with loft drying tends to make the sheet more porous. However, the increase in porosity was less in the case of starches "A" and "B" than in the cases of "C" and "D", all of the starches imparting considerably less porosity in comparison to the untreated sheet than treatment with water alone. This was not found to be universally the case in previous work, where a harder beater-sized sheet was employed.

Smoothness

The smoothness data, as measured by the Beck instrument, showed only that the untreated paper was smoother than that treated either with the starch preparations or with water alone. This effect was undoubtedly due to the cockling of the treated paper on drying, the occurrence of which has been previously mentioned in relation to the measurement of caliper and apparent density.

With regard to both significance and results, the tensile factor coincides with the mullen factor. The data show that the samples treated with starches "A" and "B" exhibit a markedly greater tensile strength indicating better adhesive properties, than do the papers treated with starches "C" and "D". Similar remarks apply to the stretch data.

Tear

The average deviation in the tear factors of the untreated samples is large, especially in Table V, though not so marked as in Table VI. In view of this variability, conclusions cannot be drawn with confidence. According to the data, surface sizing with a starch of high adhesive qualities increases the tearing strength to a considerable extent, although this observation does not seem to be strictly in accord with mill experience. Starches "A" and "B", the more adhesive starches, rate highest in point of tearing strength according to the test data. Table VI probably represents the most reliable data in respect to this test, because of the fact that sample No. 4 of Table V seems to be abnormal.

Although the porosity was greater after the tub sizing operation than before, the TAPPI and Valley size tests indicated that the originally slack-sized paper used in this investigation exhibited remarkable increase in water resistant qualities upon surface sizing with starch. These starches show the smallest increase in porosity which show the largest increases in water resistance, namely, starches "A" and "B", "B" having a slightly greater tendency in this direction than "A". The large decreases in size test shown by the water-treated samples must be attributed to the fact that the sheets after this treatment are more porous. This would probably not be the case if the paper had been internally rosin-sized to a proper extent. The differences between the results here reported and those previously observed in regard to sizing characteristics undoubtedly arise because of the fact that any sizing tendencies of the starch are not masked in the case of an originally slack-sized sheet, as they were formerly when the paper used was internally rosin-sized.

Surface Sizing

Ordinarily, surface sizing will greatly increase the paper's ability to resist the penetration of certain types of oil. The castor oil penetration test may be used to measure this property and, in general, coincides well with the ability of the sheet to absorb oil inks just to the extent that the outline of the print will not blur. In the present instance, the increase in porosity attendant to surface sizing has counteracted any tendency otherwise occurring to increase the oil resistance. The compensation of effects is so nearly balanced that there are no appreciable differences between the starch-treated sheets and the untreated samples, although the surface-sized paper shows an appreciably greater resistance to oil penetration than does the paper treated only with water. Much less weight can be placed upon this test in the present work than in that reported previously, where starches "A" and "B" were found to have the greater effect in increasing oil penetration.

Brightness

The brightness of the paper was not greatly affected by the application of starch, although a slight decrease was observed in all cases of the surface-sized paper. These small effects may have arisen from variations in the surface characteristics of the treated and untreated sheets. No significant differences between the respective starches were observed.

Pick Test

The pick test indicates the degree to which the surface fibers of the sheet are cemented together by the size as well as by the interlacing of the fibres themselves. The test is sensitive but slightly variable. It will be seen that surface sizing has effected a considerable increase in the pick test, and although no large differences are to be observed, between the respective starches, products "A" and "B" again seem to be slightly superior as regards adhesive properties. The fractions and markings after the readings arise from averaging the mean tests of two operators.

The erasure test is indicative of much the same properties as the pick test and it will be observed that a similar ranking was obtained by the two tests.

The paper treated with starches "A" and "B" took an ink equivalent to that of the Bureau of Standards without feathering when applied with a pen, while all the remaining samples showed feathering by this test. The differ-

TABLE VI—SECOND TUB SIZE RUN (CHECK RUN)

	Sample No. 1 Untreated Paper	Sample No. 2 Tub Sized Starch A	Sample No. 3 Untreated Paper	Sample No. 4 Tub Sized Starch B	Sample No. 5 Untreated Paper	Sample No. 6 Tub Sized Starch C	Sample No. 7 Untreated Paper	Sample No. 8 Tub Sized Starch D	Sample No. 9 Untreated Paper	Sample No. 10 Water Treated	Average 1,3,5,7,9
Basis weight 17x22—500 ream size	18.86	19.61	18.88	19.93	19.24	19.61	19.16	19.68	19.31	19.56	19.09
Basis weight per cent increase from average untreated sample		2.72		4.40		2.72		3.09		2.46	
Mullen ratio	115.2	171.8	113.7	168.5	113.0	158.7	112.0	161.4	114.4	117.8	113.64
Mullen per cent increase from average untreated sample		51.18		48.28		39.65		42.03		3.66	
Mullen rank of treated samples		1		2		4		3			
Caliper—inches	.00318	.003685	.003205	.003755	.003185	.00371	.003205	.003725	.00320	.003745	.003211
Apparent density	5.92	5.32	5.90	5.31	6.04	5.29	5.97	5.28	6.04	5.22	5.97
Fold—in—MIT units	62.4	167.2	57.7	184.7	55.2	160.9	55.4	183.9	65.1	73.8	59.16
Fold—in per cent increase from average untreated sample		182.6		212.2		172.0		210.9		24.75	
Fold—in—rank of treated samples		3		1		4		2			
Fold—across—MIT units	28.5	58.8	25.5	67.0	26.3	50.7	22.3	64.6	26.9	27.6	25.9
Fold—across—per cent increase from average untreated sample		127.0		158.7		95.75		149.4		6.56	
Fold—across—rank of treated samples		3		1		4		2			
Porosity—100 cc. air—Gurley densometer—seconds	139.6	120.1	136.8	115.6	137.0	106.3	136.8	110.4	138.6	96.4	137.76
Porosity—per cent increase from average untreated sample		—12.82		—16.09		—22.84		—19.86		—30.02	
Porosity—rank of treated samples		1		2		4		3			
Smoothness—Bekk—wire side—seconds	37.1	11.3	37.4	10.4	38.5	9.5	35.0	10.6	38.4	9.4	37.24
Smoothness—Bekk—felt side—seconds	30.5	7.7	26.7	7.6	32.4	7.4	29.6	8.3	28.6	8.6	29.52
Tensile factor—in	63.8	73.7	64.9	74.5	61.3	68.0	65.2	69.8	64.2	58.7	63.86
Tensile factor—in per cent increase from average untreated sample		15.41		16.66		6.48		9.30		—8.08	
Tensile factor—in—rank of treated samples		2		1		4		3			
Tensile factor—across	35.9	42.2	35.8	42.9	35.4	41.8	36.3	42.1	37.0	35.4	36.05
Tensile factor—across—per cent increase from average untreated sample		17.06		19.00		15.95		16.78		—1.80	
Tensile factor—across—rank of treated samples		2		1		4		3			
Stretch—in—per cent	2.52	4.12	2.33	4.22	2.30	3.5	2.42	3.48	2.15	2.80	2.34
Stretch—in—per cent increase from average untreated sample		76.1		80.3		49.6		48.7		19.7	
Stretch—across—per cent	5.0	7.45	5.50	7.67	5.27	7.4	5.25	7.1	5.23	6.72	5.25
Stretch—across—per cent increase from average untreated sample		41.9		46.1		41.0		35.2		28.0	
Tear factor—in	4.80	5.25	4.75	5.14	4.83	5.01	4.91	5.12	4.95	4.91	4.85
Tear factor per cent increase from average untreated sample		8.25		5.98		3.30		5.57		1.24	
Tear factor—in—rank of treated samples		1		2		4		3			
Tear factor—across	4.84	4.98	5.00	4.89	5.10	4.75	4.77	4.76	4.38	4.67	4.76
Tear factor per cent increase from average untreated sample		4.62		2.73		—.21		.00		—1.89	
Tear factor—across—rank of treated samples		1		2		4		3			
Valley size—seconds	5.59	12.96	5.66	13.59	6.00	7.19	6.12	7.89	5.90	2.79	5.85
Valley size per cent increase from average untreated sample		121.5		132.3		22.90		34.87		—52.31	
Valley size rank of treated samples		2		1		4		3			
TAPPI size—seconds	30.00	36.3	28.7	37.0	30.2	31.3	2.78	30.1	28.5	18.8	29.02
TAPPI size per cent increase from average untreated sample		25.09		27.50		7.86		3.72		—35.22	
TAPPI size rank of treated samples		2		1		3		4			
Castor oil penetration—seconds	87.1	87.2	87.3	85.9	88.1	77.2	83.7	82.7	87.7	74.0	86.78
Castor oil penetration per cent increase from average untreated sample		.484		—1.01		—11.04		—4.70		—14.73	
Castor oil penetration—rank		1		2		4		3			
Brightness	82.63	82.09	82.77	82.24	82.77	82.04	82.70	82.31	82.70	82.43	82.71
Brightness per cent increase from average untreated sample		—.750		—5.68		—.810		—.484		—.338	
Pick test (Dennison's standard waxes)	12+	17	12	17	12—	15½	12½	16—	12	11—	12
Pick test—rank of treated samples		1–2		1–2		4		3			
*Erasure	I	II+	I	III	I	II	I	II	I	II	I
Erasure rank of treated samples		2		1		3–4		3–4			
*Pen and ink test—Bureau of Standard's ink	I	III	I	III	I	I	I	I	I	I	I
Pen and ink test—rank of treated samples		1–2		1–2		3–4		3–4			
Brightness of K. & N. ink spot	43.13	47.44	45.16	47.20	46.22	45.31	45.85	44.61	45.97	43.90	45.27
Brightness per cent increase from average untreated sample		4.79		4.26		.09		—1.46		—3.03	
Brightness of ink spot—rank of treated samples		1		2		3		4			

*I = Poor. II = Fair. III = Good.

TABLE VII.—SUMMARY OF RANKS OF STARCHES FOR STRENGTH TESTS

	Mullen		Fold-In		Fold-Across		Porosity		Tensile Fac. In		Tensile Fac. Across		Tear Fac. In		Tear Fac. Across		Valley Size		TAPPI Size		Oil Penet.		Pick		Erasure		Pen & Ink B. of S. Ink		K & N. Ink Brightness	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Starch A	2	1	2	3	2	3	1	1	1	2	1	2	1	1	1	1	2	2	1	2	3	1	1–2–3	1–2	1–2	2	1–2	1–2	2	1
Starch B	1	2	1	1	1	1	2	2	2	1	2	1	4	2	4	2	1	1	2	1	4	2	1–2–3	1–2	1–2	1	1–2	1–2	1	2
Starch C	4	4	3	4	3	4	3	4	3	4	3	4	2–3	4	2	4	4	4	4	3	1	4	1–2–3	4	3–4	3–4	3–4	3–4	4	3
Starch D	3	3	4	2	4	2	4	3	4	3	4	3	2–3	3	3	3	3	3	3	4	2	3	4	3	3–4	3–4	3–4	3–4	3	4
Water only	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁	4₁

4₁ = less than number 4.
1-2} = Equals
3-4}

ences were not readily apparent to the unaided eye but were noticeable under a low powered glass.

The pen and ink test, using glycerine ink, showed no apparent differences between the samples. They all showed a tendency to feather.

The turpentine flotation test showed practically instantaneous penetration of the dyed turpentine for all samples. Any small differences which may have existed could not be measured.

The K and N ink smear and brightness test may be viewed as a measure of the ability of the sheet to absorb oil inks. The ink used is mainly composed of an oil vehicle in which is suspended a finely divided, colored pigment. The more oil the sheet will absorb within a given length of time, the more pigment will be retained by the paper. By measuring the brightness of such inked spots, it may be determined which sheets have absorbed most rapidly the ink. In making the test, an excess of the ink was placed on a definite area of the sheet and allowed to remain on it for one minute. At the end of this time the excess ink was removed and the spot wiped dry, using the same procedure in each case. The data, while not affording an exact quantitative measure, clearly indicates that starches "A" and "B", when applied to the type of paper in question, resulted in a greater resistance to penetration of the type of oil involved than was exhibited by the untreated paper or that which had been surface-sized with starches "C" and "D".

Conclusions

The data reveals certain definite and appreciable differences to exist in regard to the characteristics of the starches investigated. These differences can be reproducibly detected by the method developed and used in this investigation. The success or adequacy of the procedures employed would seem, then, to depend on the interpretation to be made as to the pertinence and significance of the respective tests in relation to the surface sizing properties of the respective starches as experienced in commercial operation. Our interpretation of the data expresses itself by ranking starches "A" and "B" as definitely superior to starches "C" and "D" for tub sizing purposes. Starch "B" may be slightly superior to starch "A"; and likewise "D" may be somewhat better than "C", but the differences here referred to are so small that an exact distinction cannot be made between the two numbers of each pair.

As quoted in this report, the Institute was working with samples the identity of which was not revealed. "A" and "B" were oxidized starches; "C" and "D" were modified starches, designated by the starch industry as "white dextrine" and "thin boiling starch."

The charts and accompanying data reveal not only the differences in the starches, but also give us a complete picture of what happens when the sheet is tubbed. The concentration of the starch solution does not seem to be as important as the absorption factor of the sheet, and the time allowed for absorption. In these particular tests, using low concentration, the results are comparable to the results obtained commercially, using five Baumé solution. This is of course due to using a slack-sized sheet at low speed and relatively low pressure.

Tables VIII, IX and X are included to give a better picture of tub sizing with starch by showing other weights and furnishes.

Table XI is a comparison of two starches at various concentrations, and shows that concentration in itself is of less importance than other factors.

Table XII is used to point more clearly the parallel between the use of starch and mechanical hydration. Examination reveals the mullen and tear factors are inherent in

TABLE VIII.—SULPHITE BOND

	Engine Sized Only	Surface Sized
Substance number	13	13
Actual weight	12.8	13.9
Thickness	2.4	2.6
Bursting strength to basis weight	Basis	Plus 23.5%
Tearing resistance	Basis	Plus 8.7%
Elongation (per cent)	2.5	2.4
Breaking length, meters	3600	4590
Folding endurance, average	110	226
Formation—density	145	171
Opacity (per cent)	...	...
Sizing quality	Feathered	Good
Penetration	4	7
Resistance to mechanical erasure	Fair	Good

TABLE IX.—SULPHITE BOND

	Not Tub Sized	Tub Sized	Not Tub Sized	Tub Sized
Substance number	20	20	20	20
Actual weight	19.9	20.4	21.0	21.8
Thickness	3.8	3.9	4.1	4.0
Bursting strength to basis weight.	33.2	35.3	33.3	36.0
Tensile strength, kg.	6.0	6.7	6.4	6.9
Elongation (per cent)	3.0	3.1	3.2	3.2
Breaking length, meters	5350	5820	5400	5800
Tearing resistance, grams	58	51	63	57
Folding endurance, average	569	547	533	652
Formation—density	60	90	53	80
Opacity (per cent)	79.8	78.2	80.8	80.5
Sizing quality	Tend. to feather	Good	Fair	Good
Penetration	52	71	68	60
Resistance to mechanical erasure	Poor	Good	Poor	Good

TABLE X—PHYSICAL TESTS ON SPECIAL 50 PER CENT RAG PAPER SUBSTANCE 24

	Machine Sample	Regular Sizing
Mullen: (Electric)	35.8	47.0
F Folding: (Schopper)		
Machine	390	585
Cross	320	230
Average	355	410
Tearing: (Elmendorf)		
Machine	85	84.5
Cross	87	88.0
Average	86	86.5
Weight: 17x22—500 (samples tested)	25.5 pounds	26.0 pounds
Relative humidity	50 per cent	
Temperature	70 deg. F.	

DATA: The paper used in the comparative sizing tests was from the same roll. The sizing was run 3 degrees Baume at 200 feet per minute at 130 degrees F.

STARCH PICK-UP IN RELATION TO FIBER STRENGTH

Mullen: (Electric)	Basis	31.3 per cent
Tearing	Basis	0.58 per cent

the fiber, and not in the starch. In a good many of the tables the same starch is used. The large increase in mullen in 100 per cent rag sheet is because of strong fiber. The increase in mullen in the news furnish is in the range as measured by per cent increase, as compared with some of the other wood fiber furnishes, although the actual increase in points is much less. It emphasizes the fact that in evaluating starch, it must be done in relation to strength of fiber.

When we think of starch in the beater, we cannot view it in the form in which it is produced, that is, a powder or pearl. We must view it in relation to the water which has been hydrated into it, and the water which is carrying the hydrated starch. It is the water which is responsible for the distribution and diffusion of the greatly swollen granule; and which enables us to distribute a relatively small amount of starch over a large area.

When we consider that the normal mill usage of starch is in quantities of 1-4 per cent; and that 100 per cent retention is not obtained, it seems hard to reconcile some of the changes which have occurred, in view of the limited amount of starch present.

When we measure the use of starch in the beater and in the tub, the dollar value of the tub operation is apparent. However, if by using Pascoe's method, we measure the relatively small amount of beater starch shown in various papers, it becomes obvious that per pound of starch present, starch in the paper is of greater value and contributes more to desired physical specifications than starch on the surface. It is the recognition of this fact which is behind the innumerable methods of manipulating starches which have been tried in the industry. The next few years may see starch taken out of the beater room, and used in the

TABLE XI

Institute File No.	Code No.	Basis Weight	Brightness	Caliper (Inches)	Fold In	Fold Across	Fold * In	Fold * Across	Ash, Per Cent	Glare Wire, (Per Cent)	Glare Felt, (Per Cent)	Grease Resistance (Sec.)	Mullen, Pts. per 100 lbs.	Opacity, (Per Cent)	Porosity, (Per cent)	Valley Size, (Sec.)	TAPPI Size, (Sec.)	Ink Flotation, (Sec.)	Smoothness (Sec.) Wire	Smoothness (Sec.) Felt	Stretch (Per cent) In	Stretch (Per cent) Across	Tensile (lbs.) In	Tensile (lbs.) Across	Tear (Grams) In	Tear (Grams) Across	Ash, (Per Cent)
70730	1st Run—5¼ deg. B, Before Tub	21.1	79.5	.0037	129	59	111	41	5.29	23.4	23.2	7.4	153	87.7	117	16.8	33.9	93.8	20.6	21.1	3.5	5.8	14.5	8.1	93.5	78.3	.81
70731	1st Run—5¼ deg. B, After Tub	22.5	77.93	.0040	417	124	290	85	5.18	23.1	22.9	18.1	206	84.4	391	26.5	39.6	191.5	8.6	18.8	4.6	7.6	19.4	10.7	82.7	72.8	.75
70732	2nd Run—4 deg. B, Before Tub	21.1	79.6	.0037	161	43	118	36	5.07	22.0	22.0	6.3	150	86.0	125	18.5	33.2	69.5	9.1	18.8	4.6	6.6	14.5	8.2	91.5	77.1	.82
70733	2nd Run—4 deg. B, After Tub	22.4	78.23	.0037	424	118	210	83	5.4	22.1	23.0	24.3	208	84.4	318	26.0	38.4	191.5	13.1	19.7	4.8	7.7	19.0	10.3	82.6	72.7	.74
70734	3rd Run—2¼ deg. B, Before Tub	21.2	79.92	.0037	131	43	135	44	5.04	23.2	23.3	9.0	152	87.7	124	17.3	35.8	68.5	26.2	19.7	3.4	6.2	15.0	8.1	91.8	78.1	.72
70735	3rd Run—2¼ deg. B, After Tub	22.5	78.58	.0040	345	85	206	82	5.38	20.6	20.8	17.5	195	85.8	227	26.0	38.8	139.5	13.3	10.9	4.4	6.9	17.9	9.9	84.4	75.4	.70
70737	Special No. 4—3¼ deg. B, Before Tub	21.1	79.88	.0039	158	45	86	34	5.86	23.4	24.6	6.6	151	87.1	134	13.5	34.5	68.1	24.2	22.6	3.1	7.2	14.3	7.8	92.4	78.2	.77
70738	Special No. 4—3¼ deg. B, After Tub	22.8	77.36	.0040	381	124	260	76	5.52	22.2	23.1	11.0	205	84.6	571	21.0	38.8	224.5	10.4	8.2	4.6	7.2	19.8	10.8	82.8	73.0	.74
70739	Special No. 5—2 deg. B, Before Tub	21.1	79.88	.0038	175	48	92	31	5.01	23.0	23.8	6.0	151	87.0	117	18.9	35.3	72.5	23.7	18.8	3.3	5.8	14.6	8.1	89.4	75.4	.76
70740	Special No. 5—2 deg. B, After Tub	22.3	77.93	.0040	387	114	255	88	5.58	20.8	22.9	14.8	201	84.4	318	23.9	40.3	304.0	10.4	7.8	4.5	7.1	18.2	9.9	80.9	75.3	.74
70741	Special No. 6—1¼ deg. B, Before Tub	21.2	79.98	.0039	153	45	97	37	5.11	23.2	23.6	7.8	153	87.1	123	16.7	33.3	70.0	22.2	18.3	3.1	6.3	13.6	8.0	92.8	79.9	.72
70742	Special No. 6—1¼ deg. B, After Tub.	22.4	78.38	.0041	285	92	230	76	5.23	21.6	22.5	10.0	200	85.2	242	26.5	39.2	222.0	12.4	8.9	4.1	6.9	18.2	10.2	87.0	74.7	.75

* After aging 72 hours at 100 deg. C. and then seasoned at 65 per cent r.h. and 70 deg. F. for 48 hours.

TABLE XII—UNBLEACHED SULPHATE
TABULATION OF STRENGTH TESTS MAXIMUM INCREASE OR DECREASE DUE TO HYDRATION

Beating Minutes	Freeness Soda	Freeness Unbleached Sulphate	Freeness Unbleached Sulphite	Freeness Bleached Sulphite	Bursting Strength (Points 100 pound sheet 25x40—500) Soda	Bursting Strength Unbleached Sulphate	Bursting Strength Unbleached Sulphite	Bursting Strength Bleached Sulphite	Tearing Strength (Points 100 pound sheet 25x40—500) Soda	Tearing Strength Unbleached Sulphate	Tearing Strength Unbleached Sulphite	Tearing Strength Bleached Sulphite
5	740	805	820	790	16	72	38	39	33	250	162	185
20	700	790	760	740	20	108	75	78	38	184	169	133
50	530	630	560	280	30	129	109	102	43	169	149	95
80	290	355	240	170	37	154	135	99	39	152	103	68
95	190	220	150		36	149	133		29	151	100	

PER CENT INCREASE OR DECREASE DUE TO HYDRATION

5	Basis	Basis	Basis	Basis	Basis	Basis	Basis	Basis
80	131	114	255	154	18.2	—39.2	—36.4	—63.2
	per cent respectively				per cent respectively			

COMMERCIAL BEATER TESTS (100 PER CENT RAG FURNISH)

60	747	92	210
90	640	95	210
120	640	112	198
150	633	115	194
180	590	120	183
210	557	125	180
240	550	140	173
270	475	150	169
300	453	155	160
330	405	165	155

NEW RAGS—PER CENT INCREASE OBTAINED DURING COMMERCIAL BEATER TESTS

165	Basis	Basis
270	+67.5 per cent	—22.9 per cent

machine room. This new development is now approaching the point where it is evident that it is only a matter of months when it will be in commercial practice. We are fairly certain that at the next general meeting enough successful operations will have been obtained to report in detail.

Literature Cited

(1) Willets, W. R., "Factors Affecting Retention," *Paper Trade J.*, 101, No. 13:81-86 (Sept. 26, 1935).
(2) Hagedorn and Jensen, *Biochem. Z.*, 135:46 (1923).
(3) Hanes, *Biochem. J.*, 23:99 (1929).
(4) Gore, H. C. and Steele, H. R., *Ind. Eng. Chem. Anal. Ed.*, 7:324 (1935).
(5) Blech and Sandstedt, *Cereal Chem.* 10:189 (1933).

Annual Report of the TAPPI Pulp Testing Committee for 1936

Authorized Committee Project No. 28, "Study of Variables of Sheet Making", was reported on at the annual meeting, 1936, by Barber and Peterson thus completing the work contemplated on this project, for the time being. Authorized Committee Projects No. 29, "A study of the Measurement of the Pulp Freeness"; No. 30, "The Establishment of a Standard Method for the Determination of Copper Number of Pulp"; and No. 31, "A Study of the Kollergang as a Pulp Testing Instrument" are being continued for further work during the year 1937.

The following tentative methods were prepared by members of the committee, and submitted to the individual members for comment and vote: (1) The Determination of the Permanganate Number of Pulp. (2) The Determination of the Bleach Requirement of Pulp. (3) The Kollergang Beating Method for Strength Testing of Pulp.

Numerous exceptions were made to the form and content of these methods, as submitted, by the members of the committee, necessitating revision and re-submission of these methods to the committee before they ars submitted to the Association as tentative standard methods. It is planned that this will be completed during the early part of 1937.—W. O. Hisey, Chairman N. Y. State College of Forestry.

TAPPI and Kalamazoo Superintendents Meet

The second annual Paper Makers Meeting, sponsored jointly by the Michigan Division of the Pulp and Paper Mill Superintendents Association and the Kalamazoo Section of TAPPI was held January 26, 1937, as a dinner meeting at the Park American Hotel, Kalamazoo, Mich. This was a general get-together meeting for all men from the mills, including executives, superintendents, foremen, and the machine, beater, finishing crews, and the technical men.

R. A. Hayward, President of the Kalamazoo Vegetable Parchment Company presided as Chairman. After introducing the officials of the two organizations and a few of the prominent local paper mill men, Mr. Hayward introduced Mr. Sanborn of the General Electric Company as the first speaker. Mr. Sanborn spoke on "Developments in the Electrical Field During the Past Year," and illustrated his talk with lantern slides. His talk covered the generation of power, stressing the high temperatures and pressure at which power is now being generated, and the utilization of power, stressing the vast improvements that have been brought about in lamps, motors, cathode ray tubes; and the new application in electrical utilization. Jacob Kindleberger, Chairman of the Board of Directors of the K.U.P. Company was the other speaker. Mr. Kindleberger spoke on "The Meaning of the Superintendent and Technical Associations. Mr. Kindleberger drew on the words: flexibility, technic, and sure footed in order to develop his talk. His talk stressed the meaning of the words, and how they should be applied if one is to make a success of ones self and his job or position.

Those present:

W. M. Parkes, A. B. Milham, C. F. Wesler, R. H. Smith, L. E. Smith, O. F. Fischer, M. R. Wilkins, N. W. Bryant, W. E. Crotty, J. Starrett, M. Meyler, R. Olson, C. Fletcher, S. H. Linder, J. L. Russell, J. A. Staus, P. Billian, J. W. Etheridge and W. Browen, Bryant Paper Company.

C. J. Wainwright, H. B. Johnston, J. C. Widmeyer and C. Abbott, Allied Paper Mills.

A. W. Cole, H. G. Heath, E. F. Whittington and H. C. Bradford, Rex Paper Company.

F. L. Zellers, E. Walker, F. Thomas, M. F. Flotow and S. D. Coleman, French Paper Company, Niles, Mich.

R. Atkins and H. Dewey, Lee Paper Company, Vicksburg, Mich.

P. G. Abbott, W. L. Barnum, S. Balch, H. S. Faram and E. G. Milham, Watervliet Paper Company, Watervliet, Mich.

H. Frank, J. Boodt, A. F. Kuckta, K. Heince, W. Beveridge, J. Wise, M. Redmond, G. Ingling and J. Jager, Kalamazoo Paper Company.

N. Cowie, C. C. Schneider, H. Stafford, P. Siwik, T. B. Doolittle and E. M. Cowling and Hawthorne Paper Company.

G. H. Rice, H. Ball, L. Clark, A. Rice, F. Boyle, J. Triestram, R. Caine, J. Hartman, R. Hass, R. Hayward, O. Hunt, J. Aube, W. Redmond, L. LaLiberte, R. B. Stewart, E. Bierema, C. Larabee, M. Youngs, D. Moffert, M. Vande Mortel, J. De Wolf, C. Shaffer, R. Cosby, R. Carpenter, L. S. Smith, W. F. Hathaway, F. Libby, A. Southon, J. Kindleberger, A. Perlick, W. Krohman, Hugh Smith, C. Cole and W. J. White, Kalamazoo Vegetable Parchment Company.

D. L. Stocker, F. L. Brown, J. B. Klein, G. C. Schmid, R. von Maur, P. de Guehery, C. C. Braginton, A. E. Hays, C. Kegeler, C. P. Davis, J. MacDonald, L. L. Broun, A. Broun, R. Walker, F. N. Warrant, W. Astle and R. Barton, Michigan Paper Company, Plainwell, Mich.

C. F. Sisson, W. F. Wolfe, M. Nichols, C. L. Miller and M. A. Hart, Mac Sim Bar Paper Company, Otsego.

J. A. Heenen, D. Balliet, D. Bachelder and A. Sherwood, Sutherland Paper Company.

F. D. Elliott, Michigan Carton Company, Battle Creek.

E. J. Turner, H. Heller, C. L. Bachelder, F. L. Chappell, Jr., H. O. Ware, A. Dreshfield, F. Shankweiler, C. Mueller, H. Hopkins, R. F. Irwin, H. Miller and E. Radant, Hercules Powder Company.

R. D. Smith and J. P. Strasser, Stein Hall Manufacturing Company.

J. Parent, Noble & Wood Machine Company.

P. Y. Tumy and Wm. Sanborn, General Electric Co.

T. R. Verdon, W. S. Taylor, V. Heinmuller and J. R. Verdon, American Cyanamid & Chemical Company.

L. Lynel, R. T. Vanderbilt; C. Richards, Krebs Pigment & Color Corp.; A. Woollam, A. E. Woollam Company; P. H. Tigwell, Beloit Iron Works; H. C. Pearson, Pioneer Paper Stock Company; A. W. MacVie, Parsons & Whittemore; J. A. Temple, J. A. Temple Company; A. F. Packer, Stearns-Stafford, Inc.; F. Rothwell, Kalamazoo City Water Works; R. A. Diehm, Rohm and Haas Company, Inc., Paul Easton, M. Loveland, C. Coleman and F. Myers.

Appleton Wire Works Joins TAPPI

The Appleton Wire Works, Inc. of Appleton, Wis. has become a company member of the Technical Association of the Pulp and Paper Industry.

The Appleton Wire Works Incorporated, one of the principal fourdrinier wire manufacturers in the United States has just celebrated its fortieth birthday. Founded in 1896 by William Buchanan, A. B. Weissenborn, G. E. Buchanan and John R. Buchanan it has grown steadily.

From a moderate beginning, the firm has expanded until now more than two hundred paper mills of the United States use wire made on its seventy looms.

A highly specialized organization making only fourdrinier wires and paper mill wire cloth has always been and is today the policy of the firm. Thus problems of individual mills are carefully studied by men trained with years of experience.

The company has designed and built practically all of its equipment. As a result of this policy, product changes have been possible when a demand for something different has arisen in the paper industry.

The wire drawing department, started the year the company opened, has always played an important part in producing a uniform product. Raw material changes can quickly be made to conform to changing conditions on the paper machine.

The officers are A. B. Weissenborn, president, W. E. Buchanan vice-president and G. E. Buchanan secretary and treasurer. The field representatives are George J. Maye, Appleton, Wis.; W. S. Hodges, Portland, Oregon; and W. J. Landfare and Smith McLandress of Holyoke, Massachusetts.

The company will be represented in the Association by W. E. Buchanan.

Pacific TAPPI Discusses Pulp Washing

The Pacific Section of the Technical Association of the Pulp and Paper Industry met at the Heathman Hotel, Portland, Ore. on January 19 and was attended by about seventy.

George S. Backus of the Oliver United Filters Inc. described the Oliver Filter. N. W. Coster of the Soundview Pulp Company described the Improved Paper Machinery Company washer. Rex Russell of the Longview Fibre Company described the diffuser washing and the Pulp Bleaching Corporation washer. A general discussion followed dealing with the causes of foaming during washing and the mechanics of why the foam cut down the capacity of the washers. One of the reasons given for this was the re-use of white water from the bleach plant.

R. B. Jeffreys, Assistant Superintendent of Development of the Australian Paper Manufacturers Ltd., Melbourne, Australia, was present and described some of the paper-making problems of Australia.

Those present were:

Wm. R. Barber, Crown Willamette Paper Company, Camas, Wash.; Carl E. Braun, Hawley Pulp and Paper Company, Oregon City, Ore.; A. A. Browne, Westinghouse Electric and Manufacturing Company, Portland; Robert A. Bremner, Electric Steel Foundry Company, Portland; G. H. Beisse, Weyerhaeuser Timber Company, Longview; Geo. S. Backus, Oliver United Filter Inc., Portland; R. S. Carey, National Aniline and Chemical Company, Portland; Geo. Charters, Crown Willamette Paper, Camas, Wash.; William W. Clarke, Longview Fibre Company, Longview; N. W. Coster, Soundview Pulp Company, Everett; J. V. B. Cox, Hercules Powder Company, Portland; R. E. Drane, St. Helens Pulp and Paper Company, St. Helens; H. J. Drew, Longview Fibre Company, Longview; Carl Fahlstrom, Longview Fibre Company, Longview.

Lyle G. Fear, Westinghouse Electric and Manufacturing Company, Portland; F. W. Flynn, Crown Willamette Paper Company, Camas; H. C. Glaze, Jr., General Electric Company, Portland; Harry W. Glenn, Crown Willamette Paper Company, Camas; T. H. Grant, Columbia River Paper Mills, Vancouver, Wash.; J. E. Hassler, Coast Manufacturing and Sales Company, Portland; Andrew D. Hawley, Crown Willamette Paper Company, Camas; George Horton, Longview Fibre Company, Longview; Wm. H. Haverman, Weyerhaeuser Timber Company, Longview.

F. M. Huddleston, Hawley Pulp and Paper Company, Oregon City; James Hull, Crown Willamette Paper Company, Camas; James B. Hyde, Crown Willamette Paper Company, Camas; R. B. Jeffreys, Australian Manufacturers, Ltd., Princes Bridge, Melbourne, Australia; W. E. Jacoby, Crown Willamette Paper Company, Camas; Lester M. Johnson, Weyerhaeuser Timber Company, Longview; W. A. Kaye, Crown Willamette Paper Company, Camas; B. L. Kerns, Westinghouse Electric and Manufacturing Company, Seattle.

W. N. Kelly, Weyerhaeuser Timber Company, Longview; Dr. E. C. Lathrop, Crown Willamette Paper Company, Camas; G. H. McGregor, Weyerhaeuser Timber Company, Longview; R. G. Mispley, Crown Willamette Paper Company, Camas; T. H. Moran, Weyerhaeuser Timber Company, Longview; C. W. Morden, Morden Machines Company, Portland; C. L. Norman, Oliver United Filters Inc., Oakland, Cal.; Clark B. Norton, Zellerbach Paper Company, San Francisco; F. A. Olmsted, Crown Willamette Paper Company, Camas; Frederic M. Pape, Wilson & George Meyer & Co., Seattle.

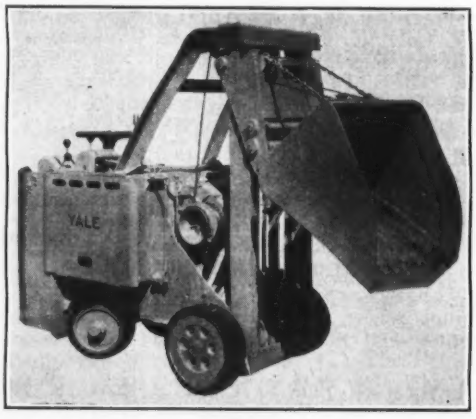
M. W. Phelps, Crown Willamette Paper Company, Camas; M. M. Peterson, Weyerhaeuser Timber Company, Longview; H. H. Richmond, Electric Steel Foundry, Portland; Rex H. Russell, Longview Fibre Company, Longview; Harlan Scott, Pacific Pulp and Paper Industry, Seattle; Chas. M. Server, Appleton Woolen Mills, Portland; Anton Siebers, Longview Fibre Company, Longview; Robert D. Steiner, Zellerbach Paper Company, San Francisco.

Lloyd E. Stevenson, Weyerhaeuser Timber Company, Longview; R. E. Strummer, Longview Fibre Company, Longview; Franz Strum, Oregon Pulp and Paper Company, Salem, Ore.; P. E. Sullivan, Ingersoll Rand Company, Seattle; Virgil M. Sutherling, Longview Fibre Company, Longview; Earl Thompson, Great Western Electric and Chemical Company, Seattle; V. L. Tipka, Crown Willamette Paper Company, Portland; Cecil L. Triplett, Hawley Pulp and Paper Company, Oregon City; Harold C. Wall, Longview Fibre Company, Longview; Fred J. Weleber, Hawley Pulp and Paper Company, Oregon City; R. S. Wertheimer, Longview Fibre Company, Longview; J. A. Wilcox, Longview Fibre Company, Longview; George Wolfe, Weyerhaeuser Timber Company, Longview; Edward P. Wood, Weyerhaeuser Timber Company, Longview.

New Yale Dumping Shovel Scoop Truck

One of Yale's latest electric industrial truck developments to meet the demands of Industry is the Dumping Shovel Scoop Truck as illustrated herewith.

This truck is capable of shoveling into a pile of sand, glass batch, coal and other miscellaneous loose materials, picking up ten to fifteen cubic feet at one shot for transportation to destination where the load can be elevated and dumped at any height, in keeping with operating requirements.



The design of this complete unit is such that it will maneuver in close congested quarters and as an example, is capable of scooping up materials from the inside of a freight car for transportation to point of usage, with speed and great flexibility.

Complete detailed information is available on this equipment by addressing The Yale & Towne Manufacturing Company, 4530 Tacony street, Philadelphia, Pa.

Flood Damage to Paper Mills Slight

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, February 1, 1937—A number of paper mills were affected in the Miami Valley as the result of the flood in the Ohio Valley the past week. While the Miami Valley was protected from inundation by a series of conservancy or detention dams, constructed after the 1913 disaster, shortage of power and the murky waters of the Great Miami and its tributaries during the period of high water resulted in a number of shut-downs.

A contributing factor towards crippling the facilities of Miami Valley paper mills and other plants, especially in Dayton, was the restriction on operations in order to provide greater motive power to Cincinnati, in the stricken district. The Dayton Power and Light Company provided one-seventh of its power to Cincinnati, virtually all that city had to depend upon following the flooding out of its own utility plants.

The Ohio Paper Company and Miamisburg Paper Company at Miamisburg, ten miles south of Dayton, were closed because of the flooding of the basements of these two plants. Flood waters also caused the Groendyke Twine Company's mills in Miamisburg to suspend operations.

Through the voluntary cooperation of the Gardner-Richardson Paper Company, the Middletown Gas and Electric Service Company was provided with power for use in that city. The company turned a part of its current over to the electric company. In making a charge for the current, it was specified that the money thus received should be turned over to the Red Cross. E. T. Gardner, president of the Gardner-Richardson Company, stated that the service being given to the city will not mean any loss of work to mill employees since the amount of power given was taken from a surplus turbine.

The Wrenn Paper Company at Middletown continued out of operation for several days, while pumps were placed in the basement of the Sorg Paper Company's mill and the Gardner-Richardson plant, with the hope of continuing operations.

The Sorg mills and the Crystal Paper Company manufacture their own electricity. Hamilton concerns with individual power plants operated, but offered to shut down to assist in applying current to the city because of discontinuance of power by the Union Gas and Electric Company, of Cincinnati.

Among the Middletown plants closing down for a time were the Fairbanks Fibre Box Company, Superior-Lawrence Bag Division of the Sorg Paper Company, Raymond Bag Company, Interstate Folding Box Company, Wardlow-Thomas Paper Company and Shartle Brothers Machine Company.

The Beckett Paper Company at Hamilton was closed for a time, while the Champion Paper and Fibre Company's mills were affected to an extent.

In Franklin, the Miami Valley Coated Paper Company and the Franklin Board and Paper Company, with their own power supplies, managed to operate.

Dayton and West Carrollton were more fortunate in the operation of their industries and both places cooperated in providing power to the stricken Ohio Valley cities.

H. M. Grasselt Leaves Collins Mfg. Co.

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., January 29, 1937—Herman M. Grasselt, of this city, a nationally known authority in the papermaking trade, has submitted his resignation as general manager of the Collins Manufacturing Company.

Mr. Grasselt, who has been associated with the company for the last ten years, presented his resignation January 1 to become effective March 31. He joined the firm in 1927 as purchasing agent and was subsequently promoted to the position of production manager. Early in 1935 he was again honored with the appointment as general manager of the company, which annually handles many United States Government contracts.

Mr. Grasselt is especially well known in the trade through his many contributions to paper trade journals on cost accounting and management. He studied in Dresden and Cologne, Germany, and for two years was export manager and foreign language correspondent for a paper export house in Amsterdam, Holland.

He came to the United States about 23 years ago and immediately became affiliated with the paper trade. For about one year he did practical work through all departments of a paper mill, in 1914 he entered the employ of the Crocker-McElwain Company, as plant clerk. In 1916 he joined the American Writing Paper Company, where subsequently he held positions as mill manager, office manager and superintendent in several of their mills. He left that company in 1925 and travelled until 1927 for a paper mill supply house.

Mr. Grasselt's resignation from the Collins Company comes as a surprise to the trade and he states that he has yet to determine his plans for the future. He lives at 483 Beech street.

Pulp Situation Discussed

One of the most vital problems facing the paper industry is the pulp situation, which probably accounted for the record attendance attracted to the regular weekly luncheon and meeting of the Eastern Division of the Salesmen's Association of the Paper Industry, held in the Florentine Room of the Hotel Lexington, New York, last Monday, when a "Pulp Forum" was held. E. R. Lyman, of the Mississquoi Corporation, New York, Eastern vice-president of the association, presided.

Among those who took part in the discussion of the pulp situation were: Charles W. Boyce, secretary of the American Paper and Pulp Association; O. F. Porter, secretary of the United States Pulp Producers Association; M. C. Dobrow, treasurer of the Writing Paper Manufacturers Association; O. F. Swanson, of J. Andersen & Co. and the Pulp and Paper Trading Company; Lester K. Larson, of the Pulp Division of Weyerhaeuser Timber Company; Henry W. Drandt, of Price & Pierce, Ltd.; Ed. E. Barrett, of the Mead Sales Corporation; G. A. Cruse, of the Riegel Paper Corporation, and others.

The consensus of opinion of the speakers was that both ground wood and chemical pulp prices would continue to display an upward trend, due mainly to increased consumption, and all present voted the meeting one of the most instructive and interesting sessions ever held in the history of the association.

Union Bag Says Property Is Assessed Too

HUDSON FALLS, N. Y., January 26, 1937—Officials of the Union Bag and Paper Company estimate the value of the property here at not over $298,905 in connection with the certiorari proceedings started recently against the local board of assessors. A petition for the writ obtained by the company is returnable before Justice Rogers in Supreme Court at Lake George early in February. The company contends that its property is assessed 166 per cent of its full market value while the valuations of other property owners are fixed at 70 per cent of the full value.

Philadelphia Paper Business Better

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., February 1, 1937.—Normally on account of repairs and inventories at this time of the year, the paper trade does not put forth any concentrated effort to secure business, but this is not true this year. The whole picture seems to have undergone a betterment which is being sustained in both fine and coarse paper lines.

With reserve stocks depleted and demand infinitely better than for several years past, the paper stock dealers find the only source of possible complaint is their ability to secure enough stock to satisfy the mills. The market is far ahead of demand in virtually every grade of paper stock, and as a result, although prices have not advanced this week, all are firmly maintained; the fact is that the situation in prices of news and mixed paper has reached a point where it can be said the tone is definitely firm.

The manufacture of paper flower pots by Fred Wilson, of Allentown, has recently been started. Mr. Wilson holds several patents on flower pots of this type and has orders booked that will keep the plant in continuous operation twenty-four hours a day for some time to come.

The Stacy Paper Box Company, Inc., manufacturers of paper boxes and containers, 1514 Chestnut avenue, Trenton, N. J., has leased a large building in the rear of 124 Division street, which will be improved and taken over at once.

Announcement is made by the Union Bag and Paper Company, Newark, N. J., of the election of James H. Allen as vice-president. Mr. Allen joined the organization in the latter part of 1934. The above company also made known that Edward J. Nobel has been elected a member of the board of directors to succeed Charles L. McMullen, recently resigned.

John Lumbaise, operator of The Essex Paper Box Company at 67 Gobel street, Newark, N. J., has purchased the plant of John Reilly Leather Company, at 40 Avenue C and Astor street. This plant has been dismantled, and besides the building, the property comprises about five and one-half acres of land. The Essex Paper Box Company has been established eleven years. It is rumored Mr. Lumbaise contemplates building a modern factory on the premises in addition to remodeling the existing construction.

Scott Paper Elects Director

At a meeting of the Board of Directors of the Scott Paper Company held January 28 William M. Carney, comptroller of the company, was elected a director to fill the vacancy left by the resignation of Harry Lieberk.

The board accepted with regret the resignation of Mr. Lieberk who has been associated with the company for 44 years and was paper mill engineer in addition to being a director of the company.

TAPPI Luncheon Speaker

The speaker for the TAPPI annual meeting luncheon to be held Wednesday, February 24 at 1 P. M. at the Waldorf-Astoria Hotel, will be Roderic Olzendam, director of the Social Security Bureau of the Metropolitan Life Insurance Company, who will speak on the subject of Social Security.

Flood Losses In Indiana

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., February 1, 1937—Floods along the entire southern section of the state during the last week or more have driven most other topics out of the picture among the paper men here. While the truth about losses to the trade in all river towns, particularly Jeffersonville, New Albany, Madison and Evansville, is not yet known, it is certain they will be enormous. It is doubtful if a single manufacturer or distributor of paper in this area has gone without losses. In many instances the very buildings have been undermined and likely will have to be replaced. In almost every case water losses to finished stock and to raw materials have been complete. Jeffersonville and New Albany were completely under water and Evansville on Saturday was half submerged.

Floods and the automobile strike combined to lessen demand for many lines of paper during the last week. Retail demand from local jobbing houses for wrapping paper and many lines of fine paper was affected. Demand for newsprint in the flood regions virtually was nil, most of the papers having suspended publication. In other sections of the state newsprint demand held steady.

Box manufacturers say the automobile strike has begun to have a telling effect on their business. The local trade provided boxes for many accessory manufacturers and these industries are curtailing their production pending adjustment of the strike. Demand for waxed paper and cellophane continues fairly steady.

Paper stock men say mill demand is rather light, most of it being confined to the better grades of rags and paper. Paying prices are about the same.

St. Regis Elects Officers

At a meeting of the Board of Directors of the St. Regis Paper Company on January 27 the following officers were elected:

F. L. Carlisle, chairman of board; R. K. Ferguson, president; C. B. Martin, vice-president; C. M. McMillen, vice-president; R. B. Maltby, vice-president; E. R. Gay, vice-president; W. J. Dixon, secretary; W. H. Versfelt, treasurer; A. T. Robinson, comptroller; W. E. Lincoln, assistant secretary and assistant treasurer; G. F. Terry, assistant secretary and assistant treasurer.

The following were appointed members of the Executive Committee: W. K. Dick, Chairman; F. L. Carlisle, R. K. Ferguson.

A resolution was adopted for merging of Harrisville Paper Corporation and Oswego Board Corporation into St. Regis Paper Company.

Eagle Lodge To Include All Employees

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., January 26, 1937—Eagle Lodge Papermakers has received from the international body authority to organize all the employees of the paper mills in the city. Previously only actual paper makers were under its jurisdiction so far as organization went. This announcement was made by John W. Bailey, president of the union after he had spent some days in Albany, N. Y., at the international headquarters to obtain this privilege. A drive for membership of all the employees has been inaugurated.

IMPORTS OF PAPER AND PAPER STOCK

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NEW YORK IMPORTS

WEEK ENDING JANUARY 30, 1937

CIGARETTE PAPER

De Mauduit Paper Corp., *Lafayette,* Havre, 1 cs.; R. J. Reynolds Tobacco Co., *American Merchant,* Havre, 70 cs.; Standard Products Corp., *American Merchant,* Havre 23 cs.

WALL PAPER

———, *Ascania,* London, 36 bls., 14 cs.; ———, *New York,* Hamburg, 17 cs.; ———, *Columbus,* Bremen, 1 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Merchant,* London, 22 bls., 2 cs.

NEWSPRINT

———, *Bergensfjord,* Skien, 682 rolls; Jay Madden Corp., *Columbus,* Bremen, 264 rolls; Jay Madden Corp., *Manhattan,* Hamburg, 350 rolls; Jay Madden Corp., *Deutschland,* Hamburg, 331 rolls; Perkins Goodwin & Co., *Deutschland,* Hamburg, 225 rolls; Perkins Goodwin & Co., *New York,* Hamburg, 719 rolls; Jay Madden Corp., *New York,* Hamburg, 456 rolls.

PRINTING PAPER

Japan Paper Co., *Ascania,* London, 1 cs.; F. L. Kramer & Co., *American Merchant,* London, 3 cs.

WRAPPING PAPER

E. Dietzgen & Co., *Deutschland,* Hamburg, 43 cs.; Jay Madden Corp., *American Traveler,* Hamburg, 348 rolls; D. F. Young, *American Traveler,* Hamburg, 714 rolls; Walker, Goulard, Plehn Co., *American Traveler,* Hamburg, 150 rolls; M. M. Cohen, *American Traveler,* Hamburg, 169 rolls.

PACKING PAPER

Gevaert Co. of America, *H. Jaspar,* Antwerp, 5 cs.

FILTER COMPOUND

Mager Bros., Inc., *Deutschland,* Hamburg, 75 bls.

FILTER MASSE

A. Giese & Son, *New York,* Hamburg, 30 bls.

FILTER PAPER

H. Reeve Angel & Co. Inc., *American Merchant,* London, 15 cs.; C. Schleicher & Schull Co. Inc., *New York,* Hamburg, 42 cs.

DRAWING PAPER

Geo. Haas, *American Merchant,* London, 8 cs.

METAL COATED PAPER

K. Pauli Co., *Deutschland,* Hamburg, 8 cs.

BARYTA COATED PAPER

Globe Shipping Co., *Deutschland,* Hamburg, 10 cs.

SURFACE COATED PAPER

Gevaert Co. of America, *H. Jaspar,* Antwerp, 1 cs.; Hensel Bruckman & Lorbacher, *New York,* Hamburg, 3 cs.

PHOTO PAPER

Medo Photo-Supply Co., *Aquitania,* Southampton, 1 cs.

COATED PAPER

W. J. Byrnes, *Aquitania,* Southampton, 2 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Scythia,* Liverpool, 9 cs. (simplex); B. F. Drakenfeld & Co., *Scythia,* Liverpool, 12 cs. (duplex).

DECALCOMANIAS

Sellers Transportation Co., *New York,* Hamburg, 5 cs.; Sellers Transportation Co., *Columbus,* Bremen, 21 cs.

TRANSFER PAPER

D. C. Andrews & Co., *New York,* Hamburg, 20 cs.

TISSUE PAPER

———, *Scythia,* Liverpool, 1 cs.

BASIC PAPER

Globe Shipping Co., *Columbus,* Bremen, 7 cs.

PAPER TUBES

———, *Deutschland,* Hamburg, 101 pkgs.; ———, *Columbus,* Bremen, 10 cs., 77 ctns.

MISCELLANEOUS PAPER

Jay Madden Corp., *Deutschland,* Hamburg, 10 bbls.; Corn Exchange Bank Trust Co., *Kwansai Maru,* Kobe, 32 cs.; Steffens Jones Co., *Montreal Maru,* Kobe, 3 cs.; C. H. Boulin, *Lafayette,* Havre, 3 cs.; Hudson F'd'g. Co., *Lafayette,* Havre, 3 bls.; Jay Madden Corp., *Columbus,* Bremen, 7 bbls.

RAGS, BAGGINGS, ETC.

Amtorg Trading Corp., *F. Engels,* Leningrad, 467 bls. waste, 539 bls. flax waste; Amtorg Trading Corp., *F. Engels,* Leningrad, 3,255 bls. rags; Banco Com'l. Italiane Trust Co., *Deutschland,* Hamburg, 34 bls. rags; Banco Com'l. Italiane Trust Co., *Manhattan,* Hamburg, 96 bls. rags; ———, *Manhattan,* Hamburg, 46 bls. paper stock; Banco Com'l. Italiane Trust Co., *American Traveler,* Hamburg, 105 bls. rags; E. J. Keller Co. Inc., *American Traveler,* ———, 95 bls. rags; W. G. Dwyer, *American Traveler,* Hamburg, 6 bls. rags; ———, *American Traveler,* Hamburg, 199 bls. rags; ———, *Kwansai Maru,* Shanghai, 50 bls. picker waste; Manufacturers Trust Co., *Kwansai Maru,* Shanghai, 50 bls. cotton waste; Banco Com'l. Italiane Trust Co., *Kwansai Maru,* Osaka, 33 bls. rags; E. J. Keller Co. Inc., *Montreal Maru,* ———, 300 bls. picker waste, 300 bls. rags; Royal Manufacturing Co.,

Montreal Maru, Shanghai, 150 bls. cotton waste; O. Smith & Son, *Montreal Maru,* Shanghai, 100 bls. cotton waste; J. J. Ryan & Son, Inc., *Montreal Maru,* Shanghai, 100 bls. cotton waste; New England Waste Co., *Montreal Maru,* Shanghai, 124 bls. cotton waste; O'Brien Padawer, *Montreal Maru,* Shanghai, 50 bls. cotton waste; O'Brien Padawer Co., *Montreal Maru,* Kobe, 50 bls. cotton waste; Royal Manufacturing Co., *Montreal Maru,* Kobe, 100 bls. cotton waste; New England Waste Co., *Montreal Maru,* Kobe, 400 bls. cotton waste; ———, *Montreal Maru,* Kobe, 300 bls. cotton waste; Manufacturers Trust Co., *H. Jaspar,* Antwerp, 96 bls. jute waste; Glaser Jaffe Woolstock Co., Inc., *Scythia,* Liverpool, 84 bls. new cuttings; ———, *Scythia,* Liverpool, 176 bls. rags; Guaranty Trust Co., *Black Gull,* Antwerp, 80 bls. paper stock; Irving Trust Co., *Black Gull,* Antwerp, 102 bls. bagging; Foss & Co. Inc., *Black Gull,* Antwerp, 78 bls. thread waste; Boger Cotton Products Co., *Black Gull,* Antwerp, 63 bls. cotton waste; E. J. Keller Co. Inc., *Black Gull,* ———, 91 bls. rags, 30 bls. bagging; ———, *Black Gull,* Rotterdam, 70 bls. rags; Loumar Textile By Products Co., *Black Gull,* Rotterdam, 69 bls. bagging; Mitsui & Co. Ltd., *Amagisan Maru,* Kobe, 1,142 bls. cotton waste; ———, *American Merchant,* London, 102 bls. paper stock; Banco Com'l. Italiane Trust Co., *New York,* Hamburg, 144 bls. rags; Bank of N. Y. Trust Co., *New York,* Hamburg, 133 bls. rags; Bank of N. Y. Trust Co., *Teresa,* Trieste, 109 bls. rags; ———, *Teresa,* Trieste, 135 bls. rags; Brown Bros. Harriman & Co., *Teresa,* Trieste, 74 bls. bagging; Guaranty Trust Co., *Teresa,* Trieste, 218 bls. rags; Banco Com'l. Italiane Trust Co., *Teresa,* Trieste, 32 bls. rags; Philadelphia National Bank, *Teresa,* Trieste, 75 bls. rags; E. J. Keller Co. Inc., *Teresa,* ———, 80 bls. paper stock.

GLUE STOCK, ETC.

American Express Co., *Scythia,* Liverpool, 683 bags hide cuttings; ———, *New York,* Hamburg, 285 bags bone glue.

OLD ROPE

———, *American Traveler,* Hamburg, 37 coils.

CASEIN

———, *Deutschland,* Hamburg, 134 bags; ———, *New York,* Hamburg, 134 bags; ———, *Pan American,* Buenos Ayres, 10 bags; American British Chemical Supplies, *Pan American,* Buenos Ayres, 417 bags.

WOOD PULP

E. M. Sergeant Pulp & Chemical Co., *Bergensfjord,* Nygaard, 1,080 bls. chemical pulp; The Borregaard Co. Inc., *Bergensfjord,* Oslo, 1,008 bls. sulphate, 110 bls. sulphite; J. Andersen & Co., *Bergensfjord,* Oslo, 2,500 bls. sulphite; Parsons & Whittemore, Inc., *Deutschland,* Hamburg, 333 bls. wood pulp, 51 tons; Central Hanover Bank Trust Co., *Deutschland,* Hamburg, 1,200 bls. wood pulp, 185 tons; Perkins Goodwin & Co., *Manhattan,* Hamburg, 300 bls. wood pulp, 46 tons; Guaranty Trust Co., *Manhattan,* Hamburg, 480 bls. sulphite, 96 tons; ———, *Manhattan,* Hamburg, 120 bls. wood pulp, 12 tons; M. Sone, *American Traveler,* Hamburg, 400 bls. wood pulp, 60 tons; ———, *American Traveler,* Hamburg, 103 bls. wood pulp, 11 tons; Perkins Goodwin & Co., *American Traveler,* Hamburg, 2,200 bls. wood pulp, 339 tons; Halifax Power & Pulp Co., *Atna,* Sheet Harbor, 4,246 bls. wood pulp; ———, *New York,* Hamburg, 1,700 bls. wood pulp, 262 tons; Castle & Overton, Inc., *New York,* Hamburg, 875 bls. wood pulp, 175 tons; Bulkley Dunton & Co., *Delaware,* ———, 1,000 bls. wood pulp.

PORTLAND IMPORTS

WEEK ENDING JANUARY 30, 1937

Bulkley Dunton & Co., *Lagaholm,* ———, 4,450 bls. wood pulp; Bulkley Dunton & Co., *Vestvard,* ———, 10,500 bls. wood pulp; Gottesman & Co. Inc., *Virginia,* Sweden, 6,800 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING JANUARY 30, 1937

Halifax Power & Pulp Co., *Atna,* Sheet Harbor, 5,321 bls. wood pulp; Bulkley Dunton & Co., *Frankfurt,* ———, 500 bls. wood pulp; Bulkley Dunton & Co., *Guilia,* ———, 300 bls. wood pulp; Bulkley Dunton & Co., *Vestvard,* ———, 2,250 bls. wood pulp; Bulkley Dunton & Co., *Quaker City,* ———, 500 bls. wood pulp; Bulkley Dunton & Co., *Black Heron,* ———, 607 bls. wood pulp; Bulkley Dunton & Co., *Tyra,* ———, 1,800 bls. wood pulp; Bulkley Dunton & Co., *Vingaren,* ———, 125 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING JANUARY 30, 1937

Royal Manufacturing Co., *Montreal Maru,* Shanghai, 50 bls. cotton waste; ———, *Montreal Maru,* Kobe, 334 bls. rags; E. J. Keller Co. Inc., *Montreal Maru,* ———, 334 bls. rags; E. J. Keller Co. Inc., *Teresa,* ———, 456 bls. rags; Gottesman & Co. Inc., *Taurus,* Sweden, 3,300 bls. wood pulp; M. Sone, *Simon von Utrecht,* Sundsvall, 1,440 bls. wood pulp; Bulkley Dunton & Co., *Simon von Utrecht,* ———, 3,150 bls. wood pulp; Bulkley Dunton & Co., *Cliffwood,* ———, 125 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING JANUARY 30, 1937

J. J. Ryan & Son Inc., *Montreal Maru,* Shanghai, 250 bls. cotton waste; Congoleum Nairn Co., *Montreal Maru,* Kobe, 182 bls. rags; New York Trust Co., *Teresa,* Trieste, 300 bls. wood pulp; ———, *Teresa,* Trieste, 1,130 bls. wood pulp; Bulkley Dunton & Co., *Alberta,* ———, 300 bls. wood pulp; Bulkley Dunton & Co., *Milos,* ———, 1,225 bls. wood pulp; Bulkley Dunton & Co., *Tana,* ———, 4,375 bls. wood pulp; M. Sone, *City of Havre,* Hamburg, 484 bls. wood pulp; M. Sone, *Ditmar Koel,* Sundsvall, 2,100 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING JANUARY 30, 1937

Gottesman & Co. Inc., *Tana,* Sweden, 6,000 bls. wood pulp.

NEWPORT NEWS IMPORTS

WEEK ENDING JANUARY 30, 1937

———, *Teresa,* Trieste, 2,850 bls. wood pulp; Bulkley Dunton & Co., *Bockenheim,* ———, 1,350 bls. wood pulp; Bulkley Dunton & Co., *Karpfanger,* ———, 16,256 bls. wood pulp.

HOUSTON IMPORTS

WEEK ENDING JANUARY 30, 1937

Darmstadt Scott & Courtney, *Montreal Maru,* Kobe, 49 bls. bagging.

GALVESTON IMPORTS

WEEK ENDING JANUARY 30, 1937

Burka Bagging Co., *Montreal Maru,* Kobe, 488 bls. bagging.

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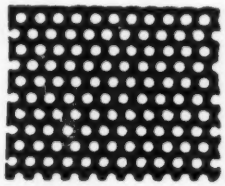

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New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, February 3, 1937.

During the past week the local paper market continued to show signs of improvement. Demand for the various standard grades of paper is well sustained. There is a scarcity of offerings in some grades, due to difficulties in filling orders. Prices are steady to firm, with a rising tendency.

The newsprint paper market is exhibiting a stronger undertone. Manufacturing operations in the United States, Canada and Newfoundland are proceeding at near capacity in order to take care of the heavy consumption. While the price situation is little changed, the outlook is considered more encouraging.

Trading in the fine paper market is fairly brisk. Demand for book, cover, bond and ledger papers is persistent. Higher prices recently announced are now effective. Tissues are moving into consumption in good volume. The coarse paper market is displaying strength. Steadiness prevails in the paper board market.

Mechanical Pulp

The ground wood pulp market is attracting more interest than of late. Demand from the paper mills is better and, with offerings rather limited, prices are stronger. Both moist and dry No. 1 imported mechanical pulp are now quoted at $33 per ton, on dock. Domestic and Canadian ground wood pulp is selling at from $33 to $34 per ton, delivered.

Chemical Pulp

Demand for the various grades of imported and domestic chemical pulp is greater than the supply and the market is decidedly firm. Bleached sulphite pulp is now quoted from $2.80 to $3.85 and easy bleaching sulphite pulp at from $2.75 to $3, on dock, Atlantic, Gulf and West Coast ports.

Old Rope and Bagging

The old rope market is displaying strength. Demand for both domestic and foreign old manila rope is fairly active. Prices continue firm. The bagging market is steady. Demand for scrap and gunny bagging is holding up well. Roofing bagging is moderately active. Bagging prices continue firm.

Rags

Conditions in the domestic rag market are steadily improving. Demand for new and old cotton rags is brisk, especially for No. 1 white shirt cuttings, which are in excellent request both for home and foreign consumption. No radical changes transpired in the roofing rag section. The imported rag market is quiet.

Waste Paper

The paper stock market is more lively than of late. Board mill demand for the lower grades is increasing and prices are firmer. Strictly folded news is now quoted at from 55 to 60 cents, f.o.b. New York. In the higher grades, book stock is stronger. Stitchless and over-issue are now quoted at from $1.25 to $1.30, f.o.b. New York.

Twine

With the prevailing demand for wrapping paper heavy, the twine market is benefiting considerably, and the various varieties are moving into consumption freely. There are a good number of inquiries around for future delivery, indicating the booking of some good sized orders. Prices are holding to formerly quoted levels.

Soundview Pulp Plans Third Unit

[FROM OUR REGULAR CORRESPONDENT]

SEATTLE, Wash., January 29, 1937—Leo S. Burdon, manager of the Soundview Pulp Company, of Everett, has announced expansion plans, now under consideration, which will make his company's plant the largest chemical pulp mill in the world. The proposal, which calls for construction of a third unit of the plant at a cost of $1,330,000, will come up before a directors' meeting in San Francisco in February.

The third unit of the plant will be a duplicate of the second, now nearing completion. When the second unit goes into operation, the mill will have a capacity output ranging from 330 to 350 tons daily of high grade bleached sulphite pulp. Completion of the proposed third unit, in June of this year according to expectations, would bring the daily output to from 450 to 470 tons.

Stronach Paper Co. Chartered

The Stronach Paper Company, of Rochester, Mich., has been incorporated under the State Laws of Michigan with $50,000 capital, consisting of five hundred shares, par value $100 per share.

Officers are as follows:—President and treasurer, W. O. Stronach; Vice president, E. L. Perry; Secretary, M. C. Wilson; all of Rochester, Michigan.

The corporate name at time of incorporation was changed from Colonial Paper Company to Stronach Paper Company to avoid confusion from a similar existing name.

Quaker City Caslon Distributor

The Munising Paper Company is pleased to announce the appointment of The Quaker City Paper Company as a distributor of Caslon Business Papers, which include Caslon Bond, Caslon Mimeograph Bond, and Caslon Ledger.

The Quaker City Paper Company have a stock and will maintain a complete inventory of all Caslon Business Papers.

Caslon distributors for Philadelphia are: Charles Beck Company, Whiting-Patterson Company, Inc., and The Quaker City Paper Company.

OUR CLAYS ARE NATURAL, THEREFORE FAST COLOR

NOT ARTIFICIALLY BLUED OR BLEACHED

Superior Quality and Service Obtains Business

ENGLISH ECCO CLAYS **CLAYS**

English China Clays Sales Corporation

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"YOUR PAPER IS MADE IN YOUR BEATERS"

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THE CORROSION RESISTANT ALLOY

CAST • ROLLED • FABRICATED

for all equipment exposed to corrosion by sulphite acids

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PULP MILL MACH'Y FINISHING ROOM MACH'Y

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APP-WELD PATENTED SEAMLESS JOINT

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SCIENTIFICALLY ENGINEERED

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Incorporated

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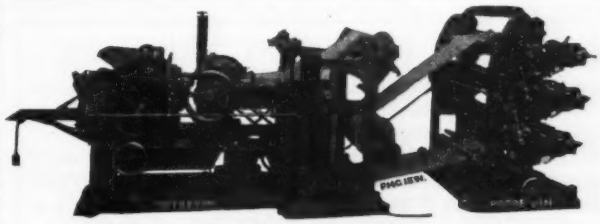

POTDEVIN

MODEL 102—HIGH SPEED

NOTION BAG MACHINE

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, February 3, 1937.

BLANC FIXE—No radical changes transpired in the blanc fixe market. Prices are generally holding to schedule. The pulp is quoted at from $42.50 to $45 per ton, in bulk; while the powder is selling at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—The position of the bleaching powder market is practically unchanged. Shipments against contract are going forward regularly. Prices continue steady. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The casein market continues strong. Domestic standard ground is still quoted at 19½ and finely ground at 20 cents; while Argentine standard ground is also selling at 19½ and finely ground at 20 cents per pound, all in bags, car lot quantities.

CAUSTIC SODA—Paper mill demand for caustic soda is well sustained. Contract shipments are moving freely. Solid caustic soda is quoted at from $2.55 to $2.60; while the flake and ground are selling at from $2.95 to $3 per 100 pounds, in drums, at works.

CHINA CLAY—The china clay market is displaying strength. The contract movement is well up to average. Imported china clay is quoted at from $13 to $21 per ton, ship side; while domestic paper making clay is selling at from $6.50 to $12 per ton, at works.

CHLORINE—Steadiness prevails in the chlorine market. Demand from the paper mills is fairly brisk. Contract shipments are moving in good volume. Prices are steady to firm. Chlorine is quoted at from $2.15 to $2.25 per 100 pounds, in tank cars, at works.

ROSIN—The rosin market is softer. Paper making gum rosin is now quoted at $9.60 and wood rosin at $9.85 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $4.13 per 100 pounds, in tank cars, at works.

SALT CAKE—Business in the salt cake market continues active. Prices remain unchanged. Salt cake is quoted at from $12 to $13; chrome salt cake at from $11 to $12 per ton, at works; while imported salt cake is selling at from $12 to $13 per ton, ship side.

SODA ASH—The soda ash market is exhibiting a strong undertone. Contract shipments are moving at a steady pace. Prices are firm. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH—Conditions in the starch market are fairly satisfactory. The contract movement is about normal. Prices are holding to schedule. Special paper making starch is quoted at $4 per 100 pounds, in bags; and at $4.27 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA—The sulphate of alumina market is in a strong position. Prices are holding to former levels. Commercial grades are quoted at from $1.35 to $1.60; while iron free is selling at from $2 to $2.25 per 100 pounds, in barrels, at works.

SULPHUR—The sulphur market is steady. Yearly contracts are quoted at $18 per long ton, on orders of 1,000 tons, or over, and $20 on smaller quantities. On spot and near by car loads, the quotation is $21 per ton. All quotations are in car lots, at works.

TALC—Trading in the talc market is moderately active. The contract movement is seasonal. Prices remain unchanged. Domestic talc is quoted at from $16 to $18 per ton, at eastern mines; while imported talc is selling at from $23 to $30 per ton, on dock.

Market Quotations

Paper

Rag Content Bond & Ledgers—Delivered Zone 1

	Bonds		Ledgers
100% Rag Ext. No. 1	.36		.37
100% Rag	.29	@	.30
75% Rag	.22	@	.23
65% Rag	.19	@	.20
50% Rag	.15½	@	.16½
25% Rag	.13	@	.14

Sulphite Bond & Ledgers—Delivered Zone 1

	Bonds		Ledgers
No. 1 Sulphite	7.65	@	8.65
No. 2 Sulphite	6.75	@	7.75
No. 3 Sulphite	6.25	@	7.25
No. 4 Sulphite	5.50		6.50

Book, B Grade, Cased (f.o.b. mill less carload freight allowed)

S. & S. C.	6.00	@	—
S. & S. C. Litho.	6.25	@	—
M. F.	5.75	@	—
No. 4 Coated and Enamel	7.00	@	—
No. 4 Coated Litho	7.00	@	—

Tissues—Per Ream

White No. 1	.82½	@	—
White No. 1 M. G.	.77½	@	—
White No. 1½	.62½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.67½	@	—
Colored	.80	@	—
Kraft	.67½	@	—
Manila	.60	@	—
Unbleached Toilet	2.60	@	3.30
Bleached Toilet	3.94	@	5.26

Paper Towels—

Unbleached	2.10	@	3.35
Bleached	3.30	@	3.70

Manila—

No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00

Fibre Papers—

No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75

(Delivered New York)

News, per ton—			
Roll, contract	42.50	@	—
Sheets	47.50	@	—
Kraft—			
No. 1 Northern	4.25	@	4.75
Standard	4.12½	@	4.25
Southern	4.00	@	—
Glazed	4.50	@	—
Striped	4.75	@	—
Boards, per ton—			
News	42.50	@	45.00
Chip	42.50	@	45.00
Sgl. Mla. Ll. Chip	52.50	@	55.00
Jute Lined Chip	52.50	@	55.00
Kraft Liners	67.50	@	70.00
White Pat. Coated	65.00	@	67.50
Binders Boards	70.00	@	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	33.00	@	—
Dry	33.00	@	—

(Delivered)

No. 1 Domestic and Canadian	33.00	@	34.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.80	@	3.85
Prime Qualities—			
Class 1 All Prime Easy Bleaching	2.75	@	3.00
Other Than Easy Bleaching—			
Class 2 Higher than Standard	2.65	@	2.90

(On Dock, Atlantic Ports)

Kraft Bleached	3.50	@	3.75
Kraft Light & Strong	2.30	@	2.90
Kraft No. 1	2.15	@	2.80
Kraft No. 2	2.10	@	2.25

(F.o.b. Pulp Mill)

Kraft Domestic	1.95	@	2.75

(Delivered)

Soda Bleached	2.70	@	—

Add 60 cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	8.75	@	9.00
Silesias No. 1	6.75	@	7.00
New Unbleached	9.25	@	9.50
Blue Overall	6.75	@	7.00
Fancy	3.00	@	3.25
Washables	2.25	@	2.50
Mixed Khaki Cuttings	3.50	@	3.75
O. D. Khaki Cuttings	4.25	@	4.50

Old Rags

White, No. 1—			
Repacked	3.25	@	3.50
Miscellaneous	2.75	@	3.00
White, No. 2—			
Repacked	2.25	@	2.50
Miscellaneous	1.75	@	2.00
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.90	@	2.00
Roofing Rags—			
No. 1	Nominal		
No. 2	1.75	@	1.85
No. 3 (bagging)	1.50	@	1.55
No. 4	1.50	@	1.60
No. 5A	1.40	@	1.50

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.50
New Mixed Cuttings	2.00	@	2.25
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxfords	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.00
No. 2 White Linens	6.50	@	7.00
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.90	@	2.15
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	2.25	@	2.50
French Blue Linens	3.50	@	4.00
German Blue Linens	2.50	@	2.75
German Blue Cottons	2.00	@	2.25
Checks and Blues	2.00	@	2.25
Linsey Garments	2.25	@	2.35
Dark Cottons	2.35	@	2.45
Old Shopperies	1.75	@	2.00
New Shopperies	1.75	@	2.00
French Blues	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.25	@	2.35
Domestic	2.15	@	2.25
Wool Tares, light	1.75	@	1.85
Wool Tares, heavy	2.10	@	2.25
Bright Bagging	1.70	@	1.75
Manila Rope—			
Foreign	3.00	@	3.25
Domestic	3.25	@	3.50
Jute Strings	2.75	@	3.00
Sisal Strings	2.60	@	2.75
Mixed Strings	Nominal		

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.20	@	3.30
Ordinary Hard White No. 1	2.50	@	2.60
Hard White No. 2	2.20	@	2.30
Soft White No. 1	2.00	@	2.10
Flat Stock—			
Stitchless	1.25	@	1.30
Over issue Mag	1.25	@	1.30
Solid Flat Book	1.15	@	1.25
Crumpled No. 1	.70	@	.80
Ledger Stock	1.25	@	1.30
New B. B. Chips	.40	@	.45
Manila—			
New Env. Cut	1.90	@	2.00
New Cuttings	1.40	@	1.50
Old Kraft Machine—Compressed bales	1.60	@	1.70
News—			
No. 1 White News	1.40	@	1.50
Strictly Overissue	.65	@	.75
Strictly Folded	.55	@	.60
No. 1 Mixed Paper	.45	@	.50

mineral pigments

NATURAL AND SYNTHETIC

FOR PERMANENT COLORS
Brown, Red and Yellow
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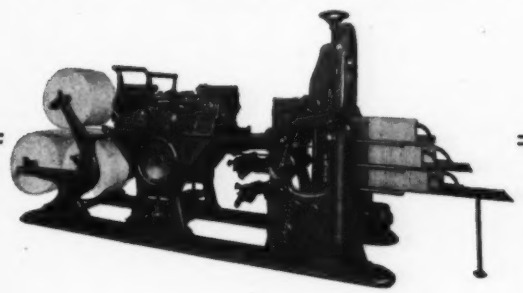

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A service based on knowledge of Southern Timber gained from twenty-five years of assiduous effort.
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COMMERCE TITLE BUILDING

High Speed Napkin Folder

It makes them all—plain, embossed and printed—quarter fold, dispenser fold, sixteenth fold and eighth fold. From 1000 to 2000 per minute—every napkin perfectly folded and delivered in a smooth, clean pack ready for wrapping. Used by every large producer in United States and foreign countries.

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Of Stainless Steel—Copper—Bronze—Monel—
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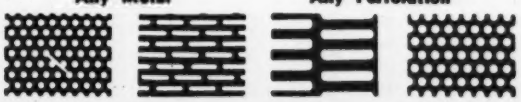
Perforations that are accurate in size
Any Metal Any Perforation



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FOR PAPER MILLS
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Twines

(F. o. b. Mill)

(Soft Fibre)

Coarse Polished—			
India	.14¾	@	.17¼
Belg. White Hemp	.15¼	@	.19¼
India Compress	.15¼	@	.15¾
Fine Polished—			
Fine India	.21	@	.23
Unpolished—			
Box	.10¾	@	.11¾
Paper Makers	.10¾	@	.12¾
Tube Rope	.11½	@	.14
Wall Paper	.12½	@	.13¾
Wrapping	.16	@	.20
Soft Fiber Rope	.13¾	@	.14¾

(Hard Fibre)

Bond	.13½	@	.22
Anchor	.13	@	.14½
Manila	.21	@	.28

PHILADELPHIA

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—

	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, M.F.	5.00	@	—
Book, S. S. & C.	5.25	@	—
Book, Coated	6.75	@	—
Coated Lithograph	6.75	@	—
No. 1 Jute Manila	10.50	@	—
Manila Sul., No. 1	6.75	@	—
Manila No. 2	4.25	@	—
No. 1 Kraft	6.00	@	—
Southern Kraft	5.00	@	—
News Print Rolls	42.50	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.08	@	.08½
New White, No. 2.	.04½	@	.05
Light Silesias	.05½	@	—
Silesias, No. 1	.04½	@	.05
Black Silesias, soft.	.03½	@	.04
New Unbleached	.06	@	—
Washable, No. 1	.02	@	.02½
Blue Overall	.07	@	.07½
Cottons—According to grades—			
Washable, No. 2	.02½	@	.04½
New Blue	.02	@	.02½
Fancy	.03	@	—
New Black Soft	.04	@	.04½
New Light Seconds	.03½	@	.04
New Dark Seconds	2.00	@	2.25
Khaki Cuttings—			
No. 1 O. D.	.04	@	.04½
No. 2 Mixed	.03¼	@	.04
Corduroy	.02	@	.02¼
New Canvas	.04	@	.04½
New Black Mixed	.02	@	.03¼

Domestic Rags (Old)

White No. 1—			
Repacked	4.00	@	4.50
Miscellaneous	3.00	@	3.50
Thirds and Blues—			
Miscellaneous	2.00	@	2.25
Repacked	2.50	@	2.75
Black Stockings (Export)	4.50	@	5.00
Roofing Stock—			
Foreign No. 1	2.20	@	2.25
Domestic No. 1	1.50	@	1.60
Domestic No. 2	1.40	@	1.50
Roofing bagging	1.10	@	1.20

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	2.00	@	—
Domestic	2.25	@	—
Manila Rope	2.75	@	—
Sisal Rope	2.25	@	2.35
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	2.25	@	2.50
No. 2	1.00	@	1.10
Wool Tares, heavy	3.25	@	3.50
Mixed Strings	1.00	@	1.10
No. 1 New Light Burlap	3.00	@	3.50
New Burlap Cuttings	2.50	@	2.75

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White.	2.30	@	2.40
No. 2 Hard White.	2.10	@	2.20
No. 1 Soft White.	1.90	@	2.00
No. 2 Soft White.	1.40	@	1.45
No. 1 Mixed	—	@	.85
Solid Ledger Stock	1.50	@	1.60
Ledger Stock, white.	1.30	@	1.35
Ledger Stock, colored	1.00	@	1.10
No. 1 Books, heavy	.90	@	1.00
Manila Cuttings	1.80	@	1.90
Print Manila	.55	@	.60
Container Manila	.55	@	.60
Kraft Paper	1.10	@	1.20
No. 1 Mixed Paper	.45	@	.50
Straw Board Chip	.40	@	—
Binders Board Chip.	.40	@	—
Corrugated Board	.60	@	.65
Overissue News	.75	@	.80
Old Newspapers	.55	@	.60

BOSTON

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.65	8.65
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.25	7.25
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¼	@	.06¼
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04¼	@	—
No. 2 Kraft	.04¼	@	—

(Delivered New England points)

Southern Kraft	.04	@	—
News Print Rolls	42.00	@	—
Straw Board, rolls	.009	—	35.00
Filled News Board	45.00	@	47.50
Chip Board	42.50	@	45.00
Single Manila Lined Chip	52.50	@	57.50
Single White, Patent Coated News Board (Bender)	65.00	@	70.00
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	70.00	@	—

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White.	2.20	@	2.35
No. 1 Soft White.	1.85	@	2.15
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.50	@	1.75
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	1.05	@	1.15
No. 1 Books, agnt.	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.50	@	1.60
Manila Env. Cuttings, extra quality	1.85	@	1.95
No. 1 Old Manila	.80	@	.85
White Blank News	1.25	@	1.30
No. 1 Kraft	1.40	@	1.45
Mixed Papers	.42½	@	.47½
Print Manila	.60	@	.70
Container Manilas	.27½	@	—
Old Newspapers	.52½	@	.57½
Overissue News	.50	@	.65
Box Board Chips	.40	@	.45
Transmission Rope	1.90	@	2.00
Corrugated Boxes	.60	@	.65
Kraft corrugated boxes	1.15	@	1.20
Screening Wrappers	.60	@	.65

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	3.50	@	3.60
Domestic	3.00	@	3.30
Jute Rope	2.25	@	2.50
Soft Jute Strings	2.50	@	2.62½
Jute Carpet Threads	1.75	@	2.00
Gunny No. 1—			
Foreign	2.25	@	2.35
Domestic	2.10	@	2.20
Bleachery Burlap	4.25	@	4.50
Scrap Burlap—			
Foreign	2.15	@	2.25
Domestic	2.10	@	2.20
Scrap Sisal	2.40	@	2.50
Scrap Sisal for Shredding	2.50	@	2.60
Wool Tares, heavy	2.25	@	2.40
New Burlap Cuttings	2.85	@	3.00
Aust. Wool Pouches	2.90	@	3.00
Heavy Baling Bagging	2.40	@	2.75
Paper Mill Bagging	1.75	@	1.80
Bagging No. 2	1.70	@	—

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.03½	@	.03¾
New White No. 1	.08¼	@	.08½
New White No. 2	.05½	@	.06
Silesias No. 1	.06¼	@	.07
New Black Silesias	.04	@	.04¼
Soft Unbleached	.08¼	@	.09
Blue Chevoit	.07	@	.07¼
Fancy	.03¼	@	.03½
Washable	.02¾	@	.03
Cottons According to grades—			
Blue Overalls	.07	@	.07¼
New Black, soft	.04	@	.04¼
Khaki Cuttings	.04¼	@	.04½
O. D. Khaki	.04½	@	.04¾
Corduroy	.03	@	.03¼
New Canvas	—	@	.05
B.V.D. Cuttings	.08	@	.08¼

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.80	@	1.90
No. 2	1.70	@	1.75
No. 3	1.30	@	1.35

Foreign Rags

(F. o. b. Boston)

Dark Cottons	2.25	@	2.35
New White Shirt Cuttings	6.50	@	6.75
Dutch Bluse	2.25	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	2.25	@	2.35
Old Linsey Garments	2.65	@	2.85
New Silesias	6.00	@	6.50

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.12	@	.40
Water Marked Sulphite Bond	.06¾	@	.11
Sulphite Bond	.05½	@	.07¼
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06½	@	.07¾
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¼	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¼	@	.05¾
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	42.00	@	—
Sheets, open	47.00	@	—
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent Coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.	1.70		
100 Test, per 1000 sq. ft.	1.85		

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings	1.70	@	2.00
No. 1 Hard White.	1.40	@	1.65
No. 1 Soft White.	1.25	@	1.50
Ledger & Writings	.60	@	.70
Solid Books	.50	@	.60
Blanks	1.00	@	1.05
Krafts	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45
Old Newspapers—			
No. 1 Folded News	.42½	@	.45
No. 1 Mixed Paper	.25	@	.30
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

TORONTO

Paper

Bonds and Ledgers

Delivered

No. 1 White	.35½	@	—
No. 1 Tints	.36½	@	—
No. 2 White	.26½	@	—
No. 2 Tints	.27½	@	—
No. 4 White	.14½	@	—
No. 4 Tints	.15½	@	—
No. 5 Bond—White	.10¾	@	—
No. 5 Bond—Tints	.11¾	@	—
No. 5 Bond — Golden Rod	.12¾	@	—
No. 5 Ledger—White	.11¼	@	—
No. 5 Ledger—Tints	.12¼	@	—
No. 6 Bond—White	.10	@	—
No. 6 Bond—Tints	.10½	@	—
No. 6 Bond—Golden Rod	.12	@	—
No. 7 Bond—White	.08¼	@	—
No. 7 Bond—Tints	.08¾	@	—
No. 7 Bond—Golden Rod	.10¾	@	—
Book—			
No. 1 M. F.	6.50	@	6.75
No. 2 M. F.	6.25	@	6.50
No. 3 M. F.	5.00	@	5.35
No. 1 S. C.	7.00	@	7.50
No. 2 S. C.	6.50	@	7.00
No. 3 S. C.	5.50	@	6.00
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	4.80	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft, No. 2	5.40	@	—

(F. o. b. Cars Toronto)

News, per ton—			
Rolls (contract)	Nominal		
Sheets	Nominal		

Pulp

Ground wood	28.00	@	—
Unbleached Sulphite	46.00	@	—
Book (Class 1)	60.00	@	—
Writing (Class 2)	61.00	@	—
Select (Class 3)	62.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.25
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.80	@	.90
Light and Crumpled Book Stock	.70	@	.80
Ledgers and Writings	.90	@	1.00
Manilas—			
New Manila Cut	1.20	@	1.40
Printed Manilas	.55	@	—
Kraft	1.00	@	1.60
News and Scrap—			
Strictly Overissue	.60	@	—
Strictly Folded	.55	@	—
No. 1 Mixed Paper	.45	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.07	@	.08¼
Fancy Shirt Cuttings	.03	@	.03½